THE EFFECTS OF AN ADVANCED PRACTICE NURSE-LED TELEPHONE-BASED

INTERVENTION ON HOSPTIAL ADMISSIONS, QUALITY OF LIFE, AND

SELF-CARE BEHAVIORS OF HEART FAILURE PATIENTS


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Amy Ford Brandon




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iii

THESIS ABSTRACT

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Heart failure (HF) is a chronic condition that has become a major public health problem. The effects of HF pose daily challenges for those living with this debilitating illness.  Frequent hospitalization related to HF exacerbation and a lack of knowledge concerning self-care requisites are barriers that individuals face when diagnosed with heart failure. Consequently, a poor quality of life (QOL) is often reported by HF patients. Based upon Orem's (2001) self-care deficit nursing theory, this study sought to determine the effect of an advanced practice nurse (APN)-led telephone-based intervention on hospital admissions, QOL, and self-care behaviors of HF patients.

A pretest, post test experimental design was utilized for this study. Participants were randomly assigned to either an experimental group that received the APN-led telephone-based intervention or a control group that received usual care. Data were analyzed using a mixed model ANOVA with a pre-test, post-test repeated measures factor on readmissions, QOL, or self-care behaviors and then an independent group's factor with the advanced practice nursing care versus standard care. Additionally, one way ANOVAs and t-tests were analyzed to determine if selected demographic variables were related to readmissions, QOL, or self-care behaviors. The results revealed a significant interaction in HF-related hospital readmissions over time in the APN-led telephone-based intervention versus standard care (F = 7.63, p = .013) and a significant interaction in self-care behaviors over time in the experimental group versus the control group (p < .001). Additionally, there was a significant relationship (p = .016) between New York Heart Association HF classification and quality of life indicating that QOL worsened with increasing severity of heart failure. The results of this study support the idea that APNs positively impact HF patient outcomes, particularly by decreasing HF-related hospital readmissions and improving self-care behaviors. Therefore, implementation of an APN-led telephone-based intervention warrants consideration in the care of patients living with heart failure.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Heart Failure (HF) is a chronic, debilitating disease, and the challenges of HF care are recognized by both patients and healthcare providers (Wagner, 2006). Patients diagnosed with HF experience progressive worsening of ventricular function that leads to fluid retention, activity intolerance from fatigue and dyspnea, and poor quality of life (QOL). The diagnosis of HF has been associated with impaired functional status and premature death with mortality rates as high as 50% within 5 years of diagnosis (Artinian, Magnan, Sloan, & Lange, 2002). Nurses are seeing HF patients readmitted with HF exacerbation shortly after being discharge from the hospital. Perhaps a consequence of suboptimal self-care behaviors, these frequent HF exacerbations has raised the concern of nurses to determine what can be done to more effectively manage heart failure patients, cease the "revolving door" HF readmissions and improve HF patients' QOL and self-care behaviors.

The prevalence of HF continues to expand, making this disease a major public health problem. It is the only cardiac disease that is increasing in prevalence (Wagner, 2006). According to the American Heart Association (AHA) (2006) nearly 5 million Americans are living with HF, and 550,000 new cases are diagnosed each year. Certain populations are especially vulnerable to readmissions, poor QOL, and inadequate

self-care behaviors associated with this disease such as the aged, blacks, and those with lower incomes.

The number of patients with HF is expected to grow as the proportion of elderly in the population increases, as the prognosis of patients with HF improves by surgical and medical interventions, and as survival from myocardial infarction improves (Jaarsma, Halfens, Tan, Huijer Abu-Saad, Dracup, & Diedricks, 2000). The incidence of HF increases with age, approaching 10 per 1,000 after age 65 (Gorski & Johnson, 2003). Heart failure is the leading diagnosis and cause of hospitalization among patients 65 years of age or older (Sisk, et al., 2006). According to the American College of Cardiology (ACC) and the AHA (2005), the prevalence of HF rises from 2% to 3% at age 65 to more than 80% in persons over 80 years of age.

Heart failure also disproportionately affects the black population. Heart failure has a 50% higher incidence in the black population than is seen in the general population (ACC/AHA, 2005). Nationally, the black population has higher mortality and hospitalization rates compared with other racial/ethnic groups (Garg, Baskar, Blum, & Bhalodkar, 2006). Blacks with HF are known to have poorer prognoses than whites, and mortality and morbidity rates have decreased less dramatically in the black population in the last two decades (Schmitz, 2007). The Alabama Department of Public Health (2007) reports that in the setting for this study, Lee County, deaths related to heart disease in the year 2005 were more prevalent in the black population with a rate of 181.9, compared to the whites with a rating of 159.8 deaths due to heart disease. Also, there are certain genetic polymorphisms noted in the black population that may predispose those patients

to a particularly aggressive cardiovascular disease process and may explain the altered responses black patients have to certain drug classes used to treat heart failure (Schmitz, 2007).

Lower income HF patients may experience variations in healthcare related to unequal privilege within the socioeconomic stratification. Socioeconomic status is strongly correlated with race and ethnic background and is a predictor of access to healthcare and education (Schmitz, 2007). Patients with lower incomes are likely to have higher cardiovascular risk factors related to lack of access to a cardiac specialist and suboptimal application of recommended treatment guidelines. Furthermore, HF patients with lower socioeconomic levels are associated with higher rates of admission and case-fatality in heart failure (McAllister, Murphy, Simpson, Stewart, MacIntyre, Kirkpatrick, et al., 2004).

Patients with HF are prone to life-threatening exacerbations of their cardiac disease, thereby requiring recurrent and frequent hospitalizations costing the nation's healthcare system an estimated $38 billion annually (Dahl, 2001). In the United States, HF is the number one diagnosis-related group (DRG) for people over the age of 65 years, and the most expensive DRG, translating into 5 million hospital days per year at an estimated cost of $8 billion (Knox, & Mischke, 1999). Heart failure patients are discharged without adequate education and resources contributing to the 30 day national readmission rate of 23% and the three to six month readmission rate of 25% to 50% (Chriss, Sheposh, Carlson, & Riegel, 2004; Knox, & Mischke, 1999). Heart failure-related readmission rates range from 15% to 30% at 90 days; data suggest about half of

these readmissions could be prevented (Anderson, Levson, Dusio, Bryant, Brown, Burr, et al., 2006; Artinian, Magnan, Sloan, & Lange, 2002).

## Problem Statement

There is evidence that over half of hospital readmissions for HF are preventable. Hardin and Hussey (2003) recognize inadequate patient education, poor symptom control, and insufficient social support as factors that contribute to preventable HF-related hospitalizations. Usual care for HF patients continues to yield frequent HF-related hospital admissions.

Usual care as recommended by the ACC and the AHA (2005) includes practice guidelines that were developed to prevent or manage chronic HF according to the stage of the disease. The guidelines of the ACC/AHA identify stages of HF to be used to compliment the New York Heart Association (NYHA) heart failure functional classification system for directing therapy of potential or actual HF patients. Stages A and B patients are best defined as those with risk factors that clearly predispose toward the development of heart failure (ACC/AHA, 2005). Patients with HF and active symptoms of the disease are classified in stages C and D, which are further defined in the NYHA classification system. Treatment for Stages A and B involve managing hypertension, diabetes, and other conditions that may threaten myocardial function, as well as preventing cardiovascular events. Moving from the focus of preventing HF to the management of HF, Stage C recommends therapy to include: diuretics, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, aldosterone antagonists, beta blockers, digitalis, or anti-arrhythmic agents. The most severe level of HF, Stage D, calls for intense fluid balance management, use of neurohormonal inhibitors, or

intravenous peripheral vasodilators and positive inotropic agents for HF management (ACC/AHA, 2005).

Educational outreach interventions and multidisciplinary disease management to implement practice guidelines are useful in attacking the barriers to behavioral changes and reducing HF-related readmissions. Usual care involves using performance measures to gauge compliance with best practice recommendations. Performance measures such as lab testing, assessing left ventricular function, weight measurement, blood pressure measurement, clinical symptoms, activity level, and patient education are linked to the QOL of the HF patient. The ACC/AHA guidelines (2005) recognize that disseminating practice guidelines without more intensive behavioral change efforts is not useful in facilitating the implementation of the practice guidelines. Therefore, it is necessary to support the patient, encouraging behavioral changes that promote self-care, improve QOL, and reduce the risk of subsequent hospitalizations for heart failure.

The researcher surmised that problems with usual care were poor access and adherence to follow up HF care. While an inpatient, the HF patient may have poor learner readiness and fail to comprehend HF education. There could be barriers to HF management, because face-to-face sessions of cardiac rehabilitation do not consider a patient's lack of transportation, inability to take off from work, or lack of childcare. Moreover, the patient may live alone and have poor social support systems that may prevent adherence to self-care behaviors associated with HF that lead to frequent HF-related readmissions. Strategies to address poor HF management must be addressed in an innovative way that fits best with the patients' needs.

Nursing interventions that go beyond usual care for post-hospitalization of HF patients include home based interventions, multidisciplinary interventions, heart failure clinics, and telephone or technology based nursing interventions. All of these approaches include education and social support. In general, nurse-directed patient education and follow up reduces hospital admission, decreases morbidity and mortality, and improves the QOL for patients with heart failure (Kutzleb, & Reiner, 2006). Nursing interventions can have the greatest impact on HF patients in the areas of patient education and social support (Gura, 2001).

The advanced practice nurse may be the primary candidate to resolve those factors that contribute to non-adherence and poor self-care behaviors through education and support of the HF patient. The role of the APN is multifaceted and provides the "big picture" aggregate perspective that can follow patients through the continuum of care. The APN makes significant contributions to the care of HF patients in the hospital, outpatient, and home setting, particularly in the role as a nurse practitioner or clinical nurse specialist. In the management of a chronic disease such as HF, APNs are a vital component in improving and maintaining quality outcome measurements to provide better patient care (McCormick, 1999). There is evidence that APN-led interventions post-hospitalization can reduce hospital readmissions among HF patients and improve outcomes (Dahl, & Penque, 2001).

While the prevalence of HF trends upward, there is a need to utilize APNs to develop innovative interventions that promote adherence to evidence-based guidelines for managing this chronic disease. Better disease management with leadership of an APN can heighten self-care behaviors and QOL of HF patients, and furthermore, decrease HF-related admissions to hospitals. Educating patients about HF treatment and consequences may increase self-care abilities and improve self-care behavior (Jaarsma et al, 2000). Heart failure or exacerbations are largely preventable when blood pressure, diet, and fluid balance are controlled (Delgado-Passler, & McCaffrey, 2006). Consequently, there is a need for an APN-led intervention that can promote self-care behaviors among HF patients that will maintain health and well-being, thus improving QOL and HF-related hospital readmission rates.

Providing some HF interventions by telephone bypasses the need for administrative and organizational accommodations such as clinic hours that have been shown to decrease access to care (Riegel, Carlson, Glaser, Kopp, & Romero, 2002). The APN-telephone calls can provide quick and easy access to a specially trained healthcare professional and manage the patients' cases in all settings providing continuity of care. "When systems are created that encourage patients to have strong relationships with well-equipped providers and when these relationships promote involvement of patients in the treatment of their illnesses, health improves" (Havranek, 2005, p. 1666).

In view of the rapidly growing prevalence of HF, frequent readmissions related to exacerbation, and diminished QOL associated with this chronic disease, the impact of the APN's role in improving care of the HF patient post discharge is critical. Therefore, the purpose of this study was to determine if HF patients that received telephone enhanced disease management led by an APN would experience fewer HF-related hospital readmissions and have improved QOL and self-care behaviors than the HF patients that received usual care.

Theoretical Framework

Orem's self-care deficit theory of nursing provided the basis of this study. This theoretical framework has been used in studies that address self-care behaviors and QOL in HF patients (Artinian, Magnan, Sloan, & Lange, 2002; Jaarsma, et al., 2000). The HF patient faces the challenge of adapting self-care behaviors to maintain health which is directly linked to QOL and hospital admissions. The sequence of actions by the HF patient and the APN dictate the degree of nursing systems or interventions that is required to maintain health.

Orem (2001) recognized that in abnormal states of health, self-care requisites arise from both the disease state and the measures used in its diagnosis or treatment. Better self-care abilities and self-care behaviors are associated with improved QOL and a higher overall feeling of well-being (Jaarsma, 2000). The QOL of patients' that assume self-care agency is lessened when they are unable to regulate their own functioning and development and extreme self-care deficits lead to frequent hospital readmissions. The Minnesota Living with Heart Failure tool is conceptually tied to Orem's Self-Care Deficit Nursing Theory, as ability to care for self is related to QOL perception.

Orem (2001) identifies two sciences of nursing: (a) Nursing practice sciences, which include wholly compensatory nursing, partly compensatory nursing and supportive-educative or developmental nursing and (b) foundational sciences which include self-care, self-care agency, and human assistance. The nursing practice science that this study aims to improve is the supportive-educative system in which the nurse action consists of regulating the exercise and development of self-care agency and the patient action consists of accomplishing self-care (Orem, 2001).

A self-care requisite is "a formulated insight about actions to be performed by or for individuals that are known or hypothesized to be necessary in the regulation of an individuals' human functioning and development, continuously or under specified conditions and circumstances" (Orem, 2001, p.224). Patients have self-care requisites that become complex with a diagnosis of heart failure. With health deviation self-care requisites as a result of HF, the patient must have knowledge of how to maintain a healthy existence with a chronic disease. If the patient has a knowledge deficit related to HF self-care behaviors, the action of self-care cannot take place, in turn, leading to a self-care deficit. Patient self-care deficits can be the result of environmental situations such as lack of heart failure knowledge, poor dietary selections, or nonexistent social support, to name a few environmental barriers. Self-care is a universal requirement for sustaining and enhancing life and health in heart failure patients, and APNs can assist clients to achieve competence in self-care.

Goodwin (1990) stated that the essence of Orem's model is the nurse-patient relationship. This relationship by its very nature is unbalanced with the patient having a need and the nurse having the ability to meet that need (Goodwin, 1990). However,

9

Orem's emphasis is that this relationship is complimentary. This means that nurses act to help patients assume responsibility for their health-related self-care by making up for existent health-related deficiencies in patient's capabilities for self-care and supplying the necessary conditions for the patients to maintain or increase health. Health education provided by the nursing professional informs, motivates, and helps patients adopt healthful lifestyles. Competence in self-care for a patient with HF is influenced by therapeutic self-care demand which is the summation of care measures necessary at specific times or over a duration of time for meeting all of an individual's known self-care requisites (Orem, 2001). Therapeutic self-care demand describes factors in the patient or the environment that must be held steady within a range of values or brought within and held within such a range for the sake of the patient's life, health, or well-being. Control and balance of factors that regulate sufficiency of air, water, and food are demanded for healthy living and a complex task in HF patients. The APN can enhance the health of the patient by advocating exercise and physical fitness, medication compliance, nutrition and weight control, stress management, and maintenance of social support systems. The goal of self-care is to empower clients and families affected by heart failure (Goodwin, 1990).

This study's intervention was focused on the nursing practice science of supportive/educative-development and the foundational science of self-care. Supportive-educative or developmental nursing calls for the patient to take primary responsibility for his or her health behaviors with the APN acting as a consultant. Self-care is learned behavior and is performed deliberately to maintain regulatory requirements associated with state of health, levels of energy expenditure, and environmental factors.

10

Chronic disease such as HF not only impacts the patient physiologically, but also influences psychological mechanisms and human functioning which are related to quality of life. Hamner and Ellison (2005) recognized the association of psychological factors such as depression and lack of social support with readmission rates, and Jaarsma, et al. (2000) linked depression with quality of life. Jaarsma, et al. (2000) recognized that knowledge of HF and learning self-care skills improves quality of life. There is also evidence to suggest that self-care behaviors are related to the psychosocial dimension of quality of life (Jaarsma, et al., 2000). Kutzleb and Reiner (2006) found that improved QOL and functional capacity has proven to be a predictor of adjustment to illness and disease self-management. Depression and lack of social support impacts hospital readmission rates and QOL, whereas SCBs and QOL have a reciprocal relationship. In view of the connections between social support, hospital readmission rates, SCBs, and QOL, the APN will need to target improving patients' knowledge of HF and teaching self-care skills. This type of intervention is linked to Orem's (2001) recommendations of a fostering a nurse-patient relationship that cultivates the patient's ability to perform self-care requisites. The aim of this study is to positively impact HF patient outcomes utilizing supportive/educative interventions in advanced practice nursing care.

Successful management of heart failure requires an active partnership between the patient and health care providers. The APN must possess nursing agency, and the HF patient must demonstrate self-care agency for a successful supportive-educative nursing system. Elements of the education plan involve both teaching content areas and self-management behaviors. The APN has tremendous potential in facilitating improved patient outcomes by guiding, directing, teaching, and providing physical and

11

psychological support to the HF patient. Applying self-care behaviors can maintain health and functioning that may ultimately decrease hospital readmissions and improve QOL.

<center>Conceptual and Operational Definitions</center>

LoBiondo-Wood, & Haber (2006) describe a conceptual definition as being similar to a dictionary definition, conveying the general meaning of the concept, but expanding beyond general language found in the dictionary by defining the concept as it is rooted in the theoretical literature. An operational definition specifies how the concept will be measured, as in, what instruments will be used to capture the concept (LoBiondo-Wood, & Haber, 2006). The concepts defined in this study are the dependent and independent variables. The dependent variables are HF-related hospital readmissions, QOL, and self-care behavior, and the independent variable is the APN-led intervention.

<center>New York Heart Association( NYHA) HF Classification</center>

Operational Definition

The NYHA HF Classification categorizes patients by functional limitations due to heart failure (AHA, 2006). Healthcare professionals determine the best course of therapy according to the NYHA HF Classification, because this system relates symptoms to everyday activities and QOL. The following is an operational definition of each class: Class I: patients with no limitation of activities; they suffer no symptoms from ordinary activities.

Class II: patients with slight, mild limitation of activity; they are comfortable with rest or with mild exertion.

Class III: patients with marked limitation of activity; they are comfortable only at rest.

Class IV: patients who should be at complete rest, confined to bed or chair; any physical activity brings on discomfort and symptoms occur at rest.

## Heart Failure-Related Hospital Readmissions

### Operational Definition

For the purpose of this study, hospital readmissions will be operationally defined as each readmission that the patient receives a primary diagnosis directly related to heart failure. The timeframe for HF-related hospital readmission measurements was during the three months prior to the initiation of the intervention and during the three months following the intervention. The readmissions will be numerically measured by patient report or noted in the patient's medical record at the clinic. The number of days that the patient is treated as an inpatient will not affect the measurement of admission frequency.

## Quality of Life

### Conceptual Definition

Quality of life was conceptually defined as the degree to which a person is perceivably happy or satisfied within the events of meaning in one's life. Orem's self-care deficit nursing theory defines patients as unitary beings or embodied persons" who exist in their environments with "physiologic, psychologic, and emotional functioning" (Orem, 2001, p. 130). Quality of life is determined by the patient's perceived value of existence within the environment. The way that a patient experiences changes in his or her health status, along with other aspects of life may be seen as a reflection of his or her quality of life (Jaarsma, et al, 2000). A person's QOL can be affected by physical health, psychological state, interaction with the environment, and self-care or level of independence. Nursing is the essential health service for persons whose QOL is gravely

13

and irreversibly affected because of serious disruption of integrated functioning (Orem, 2001, p.210).

Quality of life has been conceptualized in two dimensions, physical dimensions and emotional dimensions. Physical dimensions can be defined as symptoms of shortness of breath, fatigue, peripheral edema, and difficulty sleeping that may interfere with a patient living as they want. Emotional dimensions can be defined as concentration, memory, and loss of self control which can also impede the quality of one's life.

Operational Definition

Quality of life was operationally defined by each patient's pre- and post-test intervention scores on the Minnesota Living with Heart Failure Questionnaire (MLHFQ) which is the sum of the six-point Likert-type scale responses that range from zero to five measuring the patient's perceived quality of life. The possible score range was from 0 to 105, and a lower overall score indicated a better quality of life. The subscales of the MLHFQ are a physical dimension score and an emotional dimension score. The physical dimension score is calculated by summing the scores of questions 2, 3, 4, 5, 6, 7, 12, and 13, and the emotional dimension score is calculated by summing the scores of questions 17, 18, 19, 20, and 21 to further characterize the effect of HF on the patient's life.

<div align="center">Self-care Behavior</div>

Conceptual Definitions

Self-care behavior was conceptually defined as "the practice of activities that maturing and mature persons initiate and perform, within time frames, on their own behalf in the interest of maintaining life, healthful functioning, continuing personal development, and well-being through meeting known requisites for functional and

developmental regulations" (Orem, 2001, p. 522). While self-care is focused on actions, a self-care requisite is the ideology of performing those actions. Orem (2001) defines self-care requisite as "a formulated and expressed insight about actions to be performed that are known or hypothesized to be necessary in the regulation of an aspect(s) of human functioning and development, continuously or under specified conditions and circumstances. A formulated self-care requisite names the factor to be controlled and the nature of the required action. The patient must know what requisites are essential to successfully function with the diagnosis of heart failure and implement those actions that demonstrate self-care behaviors. The self-care agency is "a complex acquired ability of mature and maturing persons to know and meet their continuing requirements for deliberate, purposive action to regulate their own human functioning and development" (Orem, 2001, p.522).

Operational Definition

Self-care behavior was operationally defined by the sum of the Likert scale responses to the 29-item Revised Heart Failure Self-Care Scale that measures the patient's perceived self-care behaviors. The instrument described 29 behaviors that patients with HF must perform to some degree to regulate, maintain, or change, their own functioning (Artinian, Magnan, Sloan, & Lange, 2002). The patient was asked how often he or she demonstrates each behavior with a choice of "none of the time" which scores a 0 to "all of the time" which scores a 5 on the Likert scale. The possible score ranges from 0 to 145, and the higher the score the more self-care behaviors are demonstrated by the patient.

Advanced Practice Nurse-led Intervention

Conceptual Definition

The APN-led intervention was conceptually defined as nursing agency which "comprises the developed capabilities of persons educated as nurses that empower them to represent themselves as nurses and within the frame of a legitimate interpersonal relationship to act, to know, and to help persons in such relationships to meet their therapeutic self-care demands and to regulate the development or exercise of their self-care agency" (Orem, 2001, p.518). The APN-led intervention is delivered in concordance with the paradigm of nursing systems which is linked to the theoretical framework of this study. Nursing systems are a "a series of deliberate practical actions of the nurse performed at times in coordination with actions of their patients to know and meet components of their patients' therapeutic self-care demands and to protect and regulate the exercise or development of patients' self-care agency" (Orem, 2001, p. 519). The APN is a licensed professional nurse with graduate preparation and serves as a competent clinical expert, leader, collaborator, researcher, and consultant, among other roles.

Operational Definition

The APN-led intervention was operationally defined as the application of the nursing process in the disease management of HF by the documentation of intervention activities in each subject file. Interventions initiated by the APN consisted of assessing the patient's: (1) perception of current health, (2) weight, (3) shortness of breath, (4) fatigue, (5) cough frequency, (6) changes in edema, (7) chest discomfort, (8) dizziness or lightheadedness, (9) exercise habits, (10) plan of action of what symptoms warrant calling the doctor, (11) dietary intake, and (12) medication regimen adherence. The APN-

led intervention included education about the pathophysiology of HF, a low sodium diet, smoking cessation, flu/pneumonia vaccinations, when to call the physician with symptoms of exacerbation, and medication adherence. The assessments and education took place via telephone at appointed times agreed upon by the APN and the patient. The frequency of the APN-led intervention was weekly for two weeks and every two weeks for the following ten weeks. There were a total of seven phone appointments for each patient in the APN-led intervention group.

## Research Questions

The research questions for this study were:

1. Does APN-led telephone-enhanced disease management decrease HF-related hospital admissions, and increase QOL and self-care behaviors in HF patients?

2. What are the demographic characteristics of the HF patients in this clinic setting?

3. Are there relationships between selected demographic variables, NYHA classification, and the independent variables in this study, HF-related readmissions, QOL, and self-care behaviors?

## Hypotheses

The research hypotheses for this study were:

Hypothesis #1(H1):  There will be a decrease in HF-related hospital admissions for the intervention (or experimental) group compared to the usual care (control) group.

Hypothesis #2 (H1):  There will be an increase in QOL for the intervention (or experimental) group compared to the usual care (control) group.

Hypothesis #3 (H1):  There will be an increase in self-care behaviors for the intervention (or experimental) group compared to the usual care (control) group.

Hypothesis #4 (H1): There will be a positive relationship between demographic characteristics (gender, age, race, income, education, and marital status), NYHA classification, and the independent variables in this study.

## Assumptions

Assumptions are basic principles assumed to be true without the need for scientific proof (LoBiondo-Wood, & Haber, 2006). In order to interpret and assess the study accurately and fairly, the reader must acknowledge accepted concepts or truths. For this study, the following assumptions were made:

1. The subjects desired to achieve maximum health, QOL, and care for themselves.

2. Human agency, the power to act deliberately, is exercised in the form of care for self and others in identifying needs and making needed input (Orem, 2001, p.140).

3. The subjects would provide honest and accurate answers in all interactions with the APN.

4. The APN and subjects receiving the intervention would be available to speak via telephone during assigned appointment times.

5. The ability or inability of a subject to read would not affect this study.

6. Subjects will continue to contact their primary cardiologist for signs and symptoms that warrant medical attention and emergency care.

## Limitations

LoBiondo-Wood, & Haber (2006) define weaknesses or flaws within a study as limitations. The purpose of acknowledging limitations is to convey that the researcher is aware of shortcomings within the study that should be considered when applying the findings and implications.

Limitations for this study were:

1. The small sample size was a limitation for this study. There were a limited number of HF patients within the clinic setting; however the investigator preferred to use an experimental design rather than applying the intervention to all subjects. The limited sample size may affect the generalizability of the study.

2. This study was limited by a lengthiness of required participation in which some subjects were lost due to death, commonly known as the mortality effect. Also, some subjects lost interest and no longer wished to participate in a study that took place over an extended period of time.

3. Testing was also a limiting variable within this design due to the duplicate pre- and post-tests administered to subjects. When the same test was used for pre- and post-testing, some subjects may score better the second time just by learning the test.

4. Limitations imposed by subjects that were hesitant to share personal information, as well as subjects that unintentionally reported inaccurate information was recognized.

Summary

The significance of HF management to patients, nurses, and healthcare organizations is measured in many ways. The patient may have the most at stake, as HF threatens his or her existence. Heart failure can lower a patient's QOL, change self-care needs, and alter the living environment with frequent hospital readmissions. Nurses are faced with numerous HF patients with many needs in the middle of a growing nursing shortage. Nurses simply want to effectively assist the patient in maintaining his or her health and well being, and it is disappointing to nurses when patient goals are repeatedly not met. Healthcare organizations are facing the high cost of HF-related readmissions, as

well as staffing for the growing influx of patients due to the increased prevalence of heart failure.

Investigating which patients are more likely to be readmitted related to HF, have poor QOL, and suboptimal self-care behaviors, and identifying an intervention that can improve outcomes for all stakeholders in a rural, southeastern area such as Lee County, Alabama are necessary. This chapter has outlined the problem of poor HF management, the purpose of this study with associated hypotheses, definitions of key variables, assumptions, and limitations. The next chapter will focus on the review of current research related to this study.

CHAPTER II

REVIEW OF RESEARCH LITERATURE


INTRODUCTION

The role of the nurse in the management of heart failure (HF) patients' health has

become a fundamental component in attaining positive outcomes. Optimal HF

management, in addition to pharmacologic therapy, involves a coordinated plan of care

that includes individualized management, support, and promotion of self-care activities

(Hamner, 2005). Persons with HF experience physical and psychological distress,

reduced social functioning, troublesome symptoms, and frequent hospital readmissions

that lead to a diminished quality of life (Evangelista, Kagawa-Singer, & Dracup, 2001).

Orem (2001) defines nursing as "the essential health service for persons whose quality of

life (QOL) is gravely and irreversibly affected because of serious disruption of integrated

functioning" (p. 210). Investigating factors that influence HF-related hospital

readmissions, QOL, and self-care behaviors will suggest which portion of the HF

population may most benefit from a nursing intervention, and examining current practices

in telephone-based interventions and post-hospitalization interventions of HF patients

will guide the development of the plan of care for this study.  Therefore, this review of

research literature is designed to document the current state of the science.

Predictors of Readmissions Related to Heart Failure

According to the CDC (2004), hospitalizations for HF have increased substantially rising from 402,000 in 1979 to 1,101,000 in 2004 in the United States. Heart failure-related readmission rates range from 15% to 30% at 90 days post-discharge, and data suggest about half of these readmissions could be prevented (Artinian, Magnan, Sloan, & Lange, 2002). There are many predicting factors associated with HF-related readmissions noted in the research literature. Identifying the population most at risk for HF-related hospital readmissions is the first step in developing interventions aimed at avoiding preventable readmissions.

Anderson, et al. (2006) performed a systematic literature review for the purpose of organizing variables associated with the hospital readmission of HF patients into a usable framework to inform clinical practice and facilitate administrative decision making. A content analysis of retrieved articles was conducted by a doctoral prepared nurse and a master's prepared nurse with a specialty in the care of HF patients. A factor associated with hospital readmission in HF patients was defined as a variable with reported statistical significance or strong clinical significance. The research team conceptualized and defined five domains: demographic, physiologic, psychosocial, patient functioning, and resource utilization. The demographic domain contains factors associated with basic identity such as age, gender, marital status, and race. The authors found that patients at high risk for readmission were older, male, widowed, African-American, and living alone. Physiological domain contains factors that are associated with biophysical health. Risk factors for readmission in the physiological domain were atrial fibrillation, elevated blood urea nitrogen (BUN) and creatinine levels, presence of a

chronic illness such as diabetes or renal failure, polypharmacy, and smoking of tobacco use. The factors associated with mental, emotional health, and social functioning was found in the psychosocial domain. Readmission risk factors in the psychosocial domain were absence of patient motivation, depression, Life Satisfaction Index, nonadherence with medication and diet, and knowledge about the disease. The patient functioning domain consisted of readmission risk factors associated with daily living such as low self-confidence in self-care, impaired senses, cognitive status, New York Heart Association (NYHA) classification, and dependence in self-care. Finally, the resource utilization domain identified readmission risk factors that were associated with personal, community, and healthcare environments such as absence of strong social support, caregiver capacity and willingness, medication supply, previous hospitalizations, primary physician versus cardiologist use, and lack of multidisciplinary intervention that was nurse directed. The authors recommended that nurses identify "red flag" factors that may put HF patients at risk for readmission, such as an elderly male HF patient with diabetes who lives alone, and has mild dementia. At hospital discharge, factors present in the patient provided a basis for individualized discharge planning.

Using a descriptive correlational design, Hamner and Ellison (2005) sought to describe the characteristics of the population with HF who was admitted to a large, southeastern, acute-care hospital and determine which patients were at risk for readmission within six months of discharge. A computerized data bank of 557 HF patients from a two year time period identified variables of the subjects. The sample in this study was primarily white, Medicare insured, and an average age of sixty-nine years. Forty percent of the sample represented the black population. In the six months after the

index admission, 224 (40%) of the patients were readmitted to the hospital for HF, and variables significantly associated with readmission were lack of cardiology consult during admission, living with family, admission from the emergency room, receiving Medicare, and having pulmonary hypertension (Hamner & Ellison, 2005).

The retrospective chart review of 753 HF patients performed by Evangelista, Dracup, and Doering (2002) described racial differences in readmission rates of HF patients from a Veterans Administration facility. Of the sample, 60.6 % were white, 29.2 % were black, 5.4% were Asian, and 4.8% were Hispanic. Data regarding variables such as hospital readmissions, functional status, and the amount of time elapsed from the patients' awareness of worsening HF symptoms to hospital admission were collected and analyzed for a 24 month time period. The study revealed that the black population had significantly higher readmission rates and lower functional levels than the white, Asian, and Hispanic population represented in the sample. Higher New York Heart Association (NYHA) Classification which indicates lower functioning levels was identified as a HF-related hospital readmission predictor in the study.

Heart failure is the most common reason for hospitalization among people on Medicare (CDC, 2004). Rathore, et al., (2003) performed a retrospective study to evaluate differences in quality of care and patient outcomes between black and white Medicare beneficiaries hospitalized with heart failure. The sample consisted of 29,732 fee-for-service Medicare beneficiaries. The data was collected from charts and databases nationwide over a 12 month period and compiled for analysis. Black patients consisted of nearly 12% of the study cohort and were hospitalized predominantly in the South when

compared with white patients in the sample. The researchers found Medicare patients of the black population had slightly higher rates of readmission.

In their study of hospital readmission predictors, Lagoe, Noetscher, and Murphy (2001) used a methodology for data collection and analysis of variables from inpatients of an acute care facility in Syracuse, New York that were within a specific diagnosis-related group (DRG). The total sample population was divided into subpopulations based upon diagnosis related groups. The researchers found that the HF patients aged 60 to 69 years and 70 to 79 years generated readmission rates 35.4 percent and 15.4 percent higher than those of the total population admitted with medical diagnoses to an acute care facility, respectively.

Rodriguez-Artalejo, et al. (2005) performed a prospective study of 394 patients admitted with HF-related emergencies to examine the relationship between health-related quality of life (HRQL) and a first emergency hospital readmission and mortality. Over an 18 month period data was collected at four Spanish hospitals on patient variables, HRQL, the Medical Outcomes Study 36-Item Short-Form Survey, and the Minnesota Living with Heart Failure (MLWHF) Questionnaire. The researchers found that the frequency of hospital readmissions was higher in patients with low quality of life (QOL) scores.

<center>Summary</center>

The well-supported HF-related hospital readmission factors are age, race, NYHA classification, and comorbidity. Anderson, et al., (2006) and Hamner and Ellison (2005) documented significance of the lack of a cardiology consultation, admissions from the emergency department, and a comorbidity such as pulmonary hypertension. Older patients are consistently identified as being at risk for readmission (Anderson, et al.,

<center>25</center>

2006; Lagoe, et al., 2001; Rathore, et al., 2003). Anderson, et al., (2006) and Evangelista, et al., (2002) acknowledge the black population and higher NYHA classification as being at risk for readmission. Furthermore, as Hamner and Ellison (2005) recognized Medicare patients as being at risk for readmission, Rathore, et al., (2003) documented that the black population using Medicare were more at risk for readmission when compared to the white population using Medicare. Rodriguez-Artelejo, et al., (2005) and Anderson, et al., (2006) both recognized decrease in QOL or life satisfaction as a factor associated with HF-related hospital readmissions.

The findings that leave uncertainty when considering factors that place HF patients most at risk for readmissions are gender, marital status, and living partners. According to the CDC (2004), women are more at risk for HF development with about 22 percent of men and 46 percent of women likely to develop HF within six years of having a heart attack. However, Anderson, et al., (2006) suggested that males are more at risk for the HF-related hospital readmissions than females. Marital status is another factor of readmission prediction that has been discussed in the literature with no conclusive evidence. Luttik, Jaarsma, Veeger, and van Veldhuisen (2006) found no statistical significance when investigating the impact of having a partner/marital status on hospital readmissions, while Hamner and Ellison (2005) found that the HF patients in their study who lived with family were more likely to be readmitted to the hospital than those who did not. On the contrary, Anderson, et al., (2006) documented HF patients that lived alone or widowed as being more at risk for readmission.

Many factors have been studied to examine the predictability of hospital readmissions among the HF population. These findings offer valuable insight concerning patients that may be at risk for frequent hospital admissions; however, variance may exist in prediction factors for hospital readmissions based upon location and characteristics of the sample population. The nurse seeking to improve outcomes for the HF population is disadvantaged by an inconclusive definition of the HF population that is most at risk for frequent hospital readmission. While heart disease continues to be the leading cause of death in the state of Alabama (ADPH, 2005), there is hope that this study will reveal significant characteristics that are linked to HF-related hospital readmissions among the HF population in the southeastern region of Alabama and interventions may be developed to improve outcomes for this high-risk group.

## Predictors of Quality of Life in HF Patients

Quality of life refers to a polymorphous collage that embraces a patient's level of productivity, the ability to function in daily life, the performance of social roles, intellectual capabilities, emotional status, and life satisfaction (Kutzleb, & Reiner, 2006). Heart failure is a condition for which there is no cure that seriously affects the lives of patients. Patients with HF have been shown to have the poorest health perceptions and QOL compared with any other groups of patients (Evangelista, Kagawa-Singer, & Dracup, 2001). Due to the complex regimen of lifestyle prescriptions, as well as the consequences of nonadherence to recommended lifestyle changes, patients with HF are likely to perceive that they have poor quality of life. Identifying influencing factors on HF patients' QOL and the impact of poor QOL on patient outcomes will guide this study's purpose.

Luttik, et al. (2006) performed a secondary analysis of 179 HF patients with the mean age of 73 years (57% were male) to investigate the impact of marital status or live-in partners on quality of life. Ninety-six patients (54%) were married or living with a partner, and 83 patients (46%) were living alone. The QOL scores of patients living alone were consistently lower than the QOL scores of patients living with partners. However, in a multivariate model the difference in QOL was explained by other factors such as socioeconomic status, age, and gender, but not by marital status (Luttik, et al., 2006).

The descriptive, comparative study of Evangelista, Kagawa-Singer, and Dracup (2001) examined the health perceptions of patients with heart failure and whether gender differences exist. The convenience sample of 32 subjects (50% women) had a primary diagnosis of HF and received care at an outpatient HF clinic. The sample represented whites (65.6%), blacks (21.9%), and Asians (12.5%). The men were younger than the women and were more likely to be employed. Because QOL is subjective perceptions of health status, life satisfaction, and happiness, face-to- face interviews in the privacy of the patients' own homes were conducted to explore perceptions of their health with HF using a questionnaire packet. The packet contained the Health Perception Scale of the Medical Outcomes Study Short-Form General Health Survey, a visual analog scale similar to the European QOL Scale, Constructed Meaning Scale, and the Neuroticism Scale from the Eysenck Personality Questionnaire (Evangelista, Kagawa-Singer, & Dracup, 2001). Four major themes of patients' perceptions emerged from the surveys regarding the impact of HF on their lives: physical impairment, loss, role limitations, and emotional burden. The study demonstrated gender differences in health perceptions and the meaning of illness. The women perceived their health as better than the men perceived their health, and the

28

women also constructed a more positive meaning to their illness than did the men, although the findings of are limited by the small sample size.

## Summary

Heart failure patients experience physical limitations, restrictions in activities of daily living, depression, anxiety, and reduced social functioning. While HF seems to have an evident effect on QOL of the patients living with this disease, there is limited information on specific factors that influence or predict the QOL of the diverse HF population.

## Predictors of Self-Care Behaviors in HF Patients

Despite advances in medical treatment, HF is still associated with high hospitalization rates and impaired quality of life (Luttik, et al, 2006). However, the QOL and clinical outcomes of persons with HF can be improved with early diagnosis and disease management (CDC, 2004). Heart failure patients can improve their QOL and thus, decrease hospital readmission rates by taking steps to manage their chronic disease. Thus, permanent lifestyle changes and the knowledge of complicated disease management are required of the patient. Self-care behaviors are paramount in positively influencing the outcomes of HF patients. Hospital readmissions related to HF could often be prevented if the patient practiced self care behaviors in the areas of mediation and diet compliance; sought help from a health care provider in a timely manner; and performed daily assessments for edema, shortness of breath, and weight (CDC, 2004). Some patients with HF learn and practice self-care better than others, and if predictors of failure to learn or perform self-care behaviors could be identified, more time and resources could be given to the HF population that requires extra attention to master self-care.

29

Rockwell and Riegel (2001) performed a nonexperimental correlational study to test a model of individual patient characteristics, covering symptom severity, comorbidity, social support, education, age, socioeconomic status, and gender, derived from Connelly's Model of Self-Care in Chronic Illness as predictors of self-care in heart failure. The study took place in six hospitals in southern California and included 209 patients. The typical study participant was age 73 years, Class III on the Specific Activity Scale (SAS) that measures functional ability, married, grade-school educated, and earning an income of less than $20,000 per year. The genders were almost equally represented. Self-care was measured by the Evaluating the Change subscale of the Self-Management of Heart Failure Instrument. Only two of the seven variables from the model in this study were significant predictors of self-care: education and symptom severity. The authors documented that 89.7% of the variance remained unexplained and concluded that patients with higher education and who are symptomatic may be more likely to engage in self-care than those who are poorly educated or asymptomatic.

Carlson, Riegel, and Moser (2001) assessed demographic and clinical factors that may interfere with self-care and lifestyle changes made to accommodate the diagnosis of heart failure using descriptive, cross-sectional, comparative surveys. Patients were asked about their healthy lifestyle behaviors including physical activity, alcohol consumption, smoking status, and dietary habits, by using an instrument developed by the investigators. Further information about self-care was obtained by using Self-Management of Heart Failure questionnaire. The 139 patients in the sample were primarily elderly, male, retired, unmarried, and earning less than $20,000 annually. Hearing and eyesight were impaired and most patients were functionally compromised. Most of the group had

multiple HF symptoms during the past year, yet their knowledge of the importance of signs and symptoms was poor and many misperceptions were evident. Recognition of changes in signs and symptoms was difficult for most patients, but easier for those experienced with heart failure. The authors found that experienced patients were more likely to use appropriate self-care remedies than newly diagnosed patients. Few patients were comfortable evaluating the effectiveness of self-care actions and most had low self-confidence in their ability to perform self-care. The findings of this study reflect that there is a need to focus patient education on specific self-care strategies to provide clear defined actions for the HF patient.

Riegel and Carlson (2002) gathered qualitative data from a convenience sample of 26 individuals with chronic heart failure with the purpose of exploring how HF influences patients' lives, assess how they perform self-care, and determine how their life situation facilitates or impedes HF self-care. The sample was chosen from a large healthcare system in southern California, and subjects were interviewed individually or in small groups using an interview guide to standardize content. The transcribed interviews were analyzed using content analysis methods. Most of the patients in the sample were elderly, retired, high school graduates, Class III or IV using the Specific Activity Scale (SAS), poor, and unable to complete tasks requiring five or more metabolic equivalents of activity such as gardening of carrying anything up one flight of eight steps. The majority (53.8%) was married, but only 19% of the patients lived alone. Eight (31%) of the subjects were diagnosed within the previous two months, and all subjects had been hospitalized within the year. The themes in the qualitative data reflected the challenges of living with HF, self-care strategies used, and ways in which patients adapted to the

burden of heart failure. Patients have difficulty coping with the treatment, a lack of

knowledge regarding HF, personal struggles, and multiple comorbidities that are barriers

to self-care. Facilitators of self-care were when the patient had HF knowledge,

maintained control, depended on others for support, and accepted the requirements of

managing the disease.

Chriss, et al., (2004) published a study on predictors of successful heart failure

self-care maintenance in the first three months after hospitalization. The non-

experimental, correlational replication study used a convenience sample of 66 patients

with chronic heart failure. The sample was elderly, primarily female, and educated at the

high school level or above.  Approximately half of the patients had systolic HF, and most

were functionally compromised.  Self-care maintenance was measured with the

maintenance subscale of the Self-Care of Heart Failure Index, and physical functioning

was measured at baseline using both the SAS and the NYHA functional classification

system. The satisfaction subscale of the UCLA-SSI was used to measure social support.

At baseline, the model was significant and explained 14.8% of the variance in HF self-

care. Significant predictors of self-care were higher age and male gender.  Three months

later, when the baseline self-care maintenance scores were controlled in the analysis, the

model explained 45.3% of the variance in HF self-care. Most of the variance was

explained by the baseline self-care score, but male gender and low comorbidity added an

additional 6% of the variance.

Thomas and Riegel (1999) developed a method using medical records coding to identify HF-related admission diagnoses attributable to ineffective self-care. The idea that led to this study was that if patients with specific self-care deficits could be identified, they could be assisted to rectify the specific self-care activity that caused the hospitalization such as failure to monitor daily weights or maintain a low sodium diet. Furthermore, when patients were assisted in detecting the early and subtle symptoms of physiological disequilibrium, HF-related hospital readmissions were reduced (Thomas, & Reigel, 1999). This methodological study used four phases of gathering data to generate and validate a list of coded diagnoses that represent HF sequelae modifiable through self-care. Thomas and Reigel (1999) identified sixteen diagnoses that could be linked to self-care deficits including fluid overload, hypo- or hyper-kalemia, anxiety, fatigue, and edema. Using the identified diagnoses, the HF patients could be identified by health care providers with the purpose of promoting self-care behaviors, thus lower readmission rates.

One way to prevent frequent hospitalizations and promote health-outcomes among patients with HF is to ensure that the amount and the quality of self-care used is appropriate to the patient's situation. Artinian, Magnan, Sloan, and Lange (2002) performed a descriptive correlational study with the purpose of examining the frequency of performance of self-care behaviors, describing personal and environmental factors that affect self-care behaviors, and describing the relationship between the level of knowledge patients have to empower their performance of self-care and the actual performance of self-care behaviors. Participants for the study were conveniently recruited from hospitals in a metropolitan area of a large Midwestern city. There were 110 participants, 78% were

33

male, average age of 64 years, 63% were black, and 34% were white. Forty two percent of the sample reported annual income levels less than $10,000, and 67% of the sample was not married. Participants were given a series of questionnaires that took approximately 30 minutes to complete. Orem's Theory of Self-care provided the basis for this study. To measure self-care behaviors, the 29-item Revised Heart Failure Self-care Behavior Scale, and the Heart Failure Knowledge Test was used to measure the participants' knowledge of heart failure. After statistical analysis, the researchers found that the five most frequently performed self-care behaviors were related to taking prescription medication, and the five least frequently performed self-care behaviors were symptom monitoring or symptom management, such as reporting more tiredness and weight gain or monitoring fluid intake or daily weights. There were no significant relationships between the total self-care behavior score and any of the basic conditioning factors like age, sex, race, marital status and education. However, basic conditioning factors were examined in relation to specific self-care behaviors, and several significant relationships emerged. With respect to age, younger patient were less likely to talk to the doctor when anxious about worsening symptoms or when nauseated, whereas older patients were more consistent with keeping doctor's appointments and meeting the demands of the therapeutic regimen by taking pills every day and getting a flu shot once a year. Only one self-care behavior differed significantly by sex. Men more often than women reported getting a flu shot once a year.

There were nine self-care behaviors with significant differences compared by race. Blacks were more consistent in seeking medical assistance when feeling short of breath; upon observing swelling in the feet, ankles, legs, or stomach; and when experiencing nausea or loss of appetite compared with whites. Also, the mean scores for monitoring fluid intake and believing that they could adjust to HF were greater for blacks than for whites. Whites were more consistent in managing therapeutic regimen related to pill taking and getting a flu shot, as well as non smoking.

Marital status had a significant influence on three self-care behaviors. Non-married participants more often rested when they were short of breath, monitored their fluid intake, and believed they could lead a happy life. Living arrangements had a greater influence on self-care behaviors than marital status. Behaviors needed to attend to the effects of their disease were significantly less for persons living alone than those living with someone. There was a significant relationship between the mean total knowledge score and the mean total self-care behavior score which highlights the importance of any level of HF knowledge, keeping with Orem's theory that proposes that knowledge is a power that enables self-care. The researchers concluded that detailed information about the influence of basic conditioning factors on the performance of specific HF self-care behaviors can help nurses tailor interventions to the patient's situation (Artinian, Magnan, Sloan, and Lange, 2002).

The retrospective chart review of 753 HF patients performed by Evangelista, Dracup, and Doering (2002) described racial differences in treatment-seeking delays of HF patients from a Veterans Administration facility. Of the sample, 60.6 % were white, 29.2 % were black, 5.4% were Asian, and 4.8% were Hispanic. Data regarding variables such as hospital readmissions, functional status, and the amount of time elapsed from the patients' awareness of worsening HF symptoms to hospital admission were collected and analyzed for a 24 month time period. The study revealed that mean delay time in seeking treatment for worsening HF symptoms were longer for black patients than whites, Asians, and Hispanics represented in the sample.

## Summary

A review of the literature reveals that a consistent predictor of HF self-care is increasing age such as elderly individuals (Artinian, et al., 2002; & Chriss, et al., 2004). However, there is a variance in other predicting factors of self-care behaviors in the literature. Artinian, et al., (2002) found that blacks were less likely than whites to adhere to pill taking, getting a flu shot, and not smoking, and also, Evangelista, et al., (2002) found that blacks had a longer delay in seeking treatment for worsening HF symptoms than whites. Conversely, Artinian, et al., (2002) discovered that whites were less likely to report symptoms and monitor fluid balance than blacks. Chriss et al., (2004) reported that the male gender were most likely to perform self-care, while Artinian, et al., (2002) documented that there was little difference in self care behaviors between gender in their study sample, with females less likely to get a flu shot. Among those at risk for self-care behaviors are newly diagnosed HF patients and those who live alone (Carlson, et al, 2001; & Artinian, et al., 2002). There are significant relationships with self-care and

education, symptom severity, and total knowledge of HF. It is helpful to raise awareness of diagnoses associated with poor self care (Thomas, & Riegel, 1999), and identify barriers to self care such lack of knowledge of HF, poor coping, personal struggles, and multiple co-morbidities in the development of an intervention to improve the self-care behaviors of HF patients (Riegel, & Carlson, 2002).

The National Guideline Clearinghouse (2007) recommends that HF patients practice specific self-care behaviors to maintain health and manage heart failure. The recommendations are daily self-monitoring of weight and adherence to recommended patient action plan, recognition of symptoms and when to seek medical attention, moderate dietary sodium restriction, risk factor medication, avoidance of illicit drug use and smoking, obtaining flu and pneumonia vaccinations, and restriction of alcohol intake and nonsteroidal anti-inflammatory drugs. By adhering to self-care guidelines, HF patients have the best chance at achieving positive outcomes.

Telephone Interventions for All Chronic Conditions

Telephone interventions have been implemented with the purpose of optimizing self-care behaviors, improving QOL, and reducing readmissions of patients with HF, as well as other chronic conditions. To determine the strength of a HF intervention that employs frequent contact with the patient via telephone, it is important to consider this type of intervention's influence on patients with other chronic disease such as chronic obstructive pulmonary disease (COPD), dyslipidemia, and diabetes.

Brooks, Fancott, Falter, McFarlane, and Nonoyama (2004) performed a project to develop and validate a protocol for a COPD helpline. Ten key informants with expertise in helpline development or COPD were interviewed, and fifty individuals with COPD

participated in content validation of the protocol. There were three components to this project. First, the literature and theoretical frameworks were used to inform protocol development. Second a consultation process was used to develop the components of the protocol. Third, the protocol was applied with individuals with COPD to seek their input.

Within the Health Belief Model, the authors focused on ensuring that the helpline included components that reinforced issues of susceptibility and severity and recognized the benefits and options of treatment. Using the social learning theory model, the authors focused on the importance of positive reinforcement by Helpline operators to provide encouragement to callers for appropriate behavior and knowledge. Within the self-efficacy theory, the authors recognized the importance of verbal persuasion, that is, convincing the caller that he/she is able to perform the task, and reinforcing behaviors that have been completed successfully. On the basis of the self-efficacy theory, the authors recognized the importance of follow-up calls for individuals for whom a change in behavior or a specific action is recommended.

The findings from this study were that the majority of the calls from individuals with COPD sought medical information (74%) and required an average of 36 minutes to complete. The availability of the call center was identified as one means of replacing information sought from other healthcare providers. The authors state that the literature for telephone based interventions within the respiratory field are scarce, and this study is the first report of the development of a helpline for persons with COPD, with specific aims to help individuals better manage their disease through improved understanding of COPD, its symptoms and management.

Young, Sparrow, Gottlieb, Selim, & Friedman (2001) described the operation of a telephone-linked computer system that aimed to improve the management of COPD, improve QOL for COPD patients, and reduce acute-healthcare utilization. This innovative computer-based telecommunications system educated and monitored patients in their homes and promoted self-care through frequent, totally automated telephone encounters that complemented office visits with physicians. The intervention required that the patients call weekly on a day of their choosing, and if the patient failed to call within two days of the scheduled day, the system called the patient. At the start of each call the patients were asked to enter a personal password to ensure security and confidentiality. Then the system asked questions to identify symptoms of COPD exacerbation. Patients were asked about their understanding of and adherence to their medication, and the final part of the conversation was the counseling component that reminded the patient about physician appointments, smoking cessation, vaccinations, and encouraging exercise. There was no evidence if this method significantly reduced the frequency of COPD exacerbation, improves QOL, or reduces acute healthcare utilization.

Palmieri, Redline, and Morita (2005) performed a retrospective chart review over a 15 month period with the purpose of assessing changes in low-density-lipoprotein cholesterol (LDL-C) levels and the rate of LDL-C goal attainment among dyslipidemic patients newly referred to a telephone-based hyperlipidemia disease management program. The patients included in this study were between 18 and 80 years of age, under the continuous care of a physician during the data collection period, had a baseline LDL-C measurement within the year before program enrollment, and had been assigned to a treatment protocol. For each patient, the final cholesterol value after six months of

enrollment or the first value at goal was used to evaluate response. Subjects were deemed

to have reached their goal if an LDL-C value recorded within six months after enrollment

corresponded to national guidelines for their assigned protocol. There were 205 subjects

eligible for the study. Forty-two patients were assigned to a secondary-prevention group,

69 to the diabetes group, 46 to the high-risk primary-prevention group, and 48 to the low-

risk primary-prevention group. The telephone-based hyperlipidemia management

program consisted of nurse and pharmacist case managers that provided patient education

over the telephone and were authorized by the physician to order laboratory work and

prescribe and monitor lipid-lowering medications under protocol. Overall, LDL-C goals

were attained in all groups. The investigators concluded that LDL-C goal-attainment rates

increased in patients referred to a telephone-based hyperlipidemia management program.

Wong, Mok, Chan, & Tsang (2005) conducted a randomized controlled trial to

compare the outcomes of diabetic patients undergoing either early discharge or routine

care in a regional hospital in Hong Kong. A total of 101 patients who needed glycemic

monitoring, but who were otherwise fit for discharge, were recruited as participants. The

sample was randomly assigned to either the study group or the control group. The control

group received usual care. The study group was discharged early and received a follow

up program which included a weekly or biweekly telephone call from a nurse. The study

group received a standardized education program prior to discharge on essential self-care

skills. The diabetes nurse specialist (DNS) made telephone contact with the patient every

1-2 weeks until their glycemic levels were stable. When compared with the control

group, the study group had a greater decrease in hemoglobin A1C levels at 24 weeks, a

higher blood monitoring adherence score at both 12 weeks and 24 weeks, and a higher

40

exercise adherence score at 12 weeks and 24 weeks. The study group had a shorter

hospital stay and the net savings were $11,888 per patient.

Summary

The telephone interventions for chronic diseases other than HF have resulted in

positive outcomes for patients with diabetes and dyslipidemia. However, there is limited

research on telephone-based interventions for COPD patients. Palmieri, et al., (2005)

found that a nurse and pharmacist led telephone intervention achieved goals of attaining

designated LDL-C levels, and Wong, et al., (2005) found that a diabetes nurse specialist

calling the patient weekly or biweekly for follow-up could decrease hemoglobin A1C

levels, increase exercise adherence, and shorten hospital stays for patients, thus saving

healthcare costs. While the research is scarce for telephone-based interventions for other

chronic illnesses, there is an abundance of evidence in the research regarding telephone-

based interventions for HF management.

Non-APN Led Telephone Interventions for Heart Failure Patients

Although there is an abundance of telephone interventions for HF patients, there

is variation in the preparation of the nurse that is providing the intervention and disease

management. An advanced practice nurse (APN), in this study, was defined as a master's

prepared nurse that is certified as a clinical nurse specialist or nurse practitioner.

Therefore, non-APNs will be registered nurses that have been prepared at the associate's

or bachelor's level of education. This section of the review of research literature will

investigate telephone-enhanced or telephone-based interventions offered to HF patients

by a nurse that is not an advanced practice nurse.

Using a randomized, controlled trial, Shearer, Cisar, and Greenberg (2007) examined the effects of a telephone-delivered empowerment intervention (EI) on outcomes in patients with HF, including purposeful participation in goal attainment, self-management of HF, and perception of functional health. The three nurses leading the intervention were referred to as nurse clinicians, but there was no specification of the nurses' education level. A convenience sample of 90 men and women aged 21 years and older with a HF diagnosis was obtained from a metropolitan hospital in the southwestern United States. On average, participating patients were married, white, well-educated males with a mean age of 76 years, and a NYHA Class III. The participants were randomly assigned to the control group or EI group. All participants received standardized HF patient education, but the intervention group received an EI delivered through telephone follow-up calls from a registered nurse. All members of the sample completed a demographic data form and a questionnaire packet, then the control group members were told that in 12 weeks they would receive a telephone call from a nurse reminding them that a questionnaire packet would be sent to them to complete and return in an addressed, postage paid envelope. The intervention group was contacted 1 to 3 days after discharge from the hospital and then at 2, 4, 6, 8, and 12 weeks after discharge (Shearer, et al., 2007).

At the beginning of the conversation, the EI focused specifically on what was important to the patient in self-management, goal attainment, and functional health prior to following the standardized questions related to symptoms, reporting, and adherence. During the final telephone-delivered intervention, the patient was reminded that a questionnaire packet would be sent, which needed to be completed and returned in the

addressed, postage paid envelope. Data were collected using the Power as Knowing

Participation in Change Tool VII to measure purposeful participation, SF-36 to measure

functional health, and the Self-Management of Heart Failure (SMHF) scale to measure

self-management. There were no significant differences in demographic, physiologic

measures, or measures of purposeful participation in attaining health goals, functional

health, and self management at baseline between the EI and control group. There was a

significant increase in SMHF scores from pretest to posttest in the EI group compared

with the control group. The investigators found that telephone-delivered EI facilitated

self-management of HF through self-care activities in EI group members (Shearer, Cisar,

and Greenberg, 2007).

Sisk, et al. (2006) tested the effect of nurse managers on the health of people with

HF who were getting care from hospital clinics and practices in a minority community

using a randomized effectiveness trial. The sample consisted of 406 HF patients who

received their care at the four hospitals in Harlem and New York, New York. Almost half

of the people were black, and one third was Hispanic. The researchers assigned

participants at random to a nurse manager or usual care. There were three nurses that

were referred to as nurse managers and specially trained for this study, but the education

level of the nurses was not disclosed. Participants in the usual care group received printed

consumer guidelines for managing heart failure. The nurse managers counseled

participants on HF symptoms and the benefit of a low-salt diet. They provided the

participants' doctors with feedback about how participants are doing. Hospitalizations

were measured using patient report and billing data, and functioning status was measured

using the generic Short Form-12 (SF-12) and the Minnesota Living with Heart Failure

Questionnaire (MLHFQ) during the first face-to-face meeting and subsequent telephone interviews that occurred every three months. Over a one year time period, the participants in the nurse manager group had fewer hospitalizations and could perform everyday activities better than those in the usual care group. Furthermore, the differences between the two groups did not continue after one year when the nurses were no longer counseling the patients. The researchers concluded that nurse management with a telephone-enhanced intervention can improve functioning and modestly lower hospitalizations in ethically diverse ambulatory care patients who have HF with systolic dysfunction.

A multi-center randomized controlled trial in Argentina examined whether a centralized telephone intervention reduces the incidence of death or admission for worsening HF in outpatients with chronic heart failure (GESICA Investigators, 2005). The nurses leading the intervention were trained in the management of patients with chronic HF, but the education level of the nurses was not mentioned by the authors. The sample included 1518 outpatients with stable chronic HF. The sample was an average age of 65 years, 71% male, NYHA II or III, and about 80% had systolic dysfunction. The outcomes of the study included admission to hospital for worsening HF and QOL which was measured using the MLHF questionnaire. Both the control group and the intervention group received similar care from their cardiologists. The intervention included the patient receiving an education booklet and receiving a telephone call from a trained HF-management nurse within a week after discharge. The nurse followed a standardized questionnaire that was based on five main objectives: adherence to diet, adherence to drug treatment, monitoring of symptoms, control of signs of fluid retention, and daily physical activity. The first four telephone calls were made fortnightly, but they

could be made more often according to the needs of the patient and the nurse's decision. After the fourth telephone call, the interval was automatically determined, on the basis of established criteria, using data recorded at each phone contact. The investigators found that significantly fewer cardiovascular admissions were recorded in the intervention group than in the control group, and patients in the intervention group had better QOL than control group patients at the end of the study. The authors concluded that a simple, centralized HF program was effective according to the significant reduction in admissions to hospital for heart failure.

DeBusk, et al., (2004) performed a telephone-mediated nurse care management program for HF patients with the aim of reducing the rate of HF-related and all cause hospital readmission over a 1-year period. The study was a randomized, controlled trial of usual care with nurse management versus usual care alone from May 1998 to October 2001 using patients from five northern California hospitals. There was no mention of the nurses' training or education level in the study. The sample included 462 participants that were randomly assigned to either an intervention group or usual care group. The mean age of the sample was 72 years, and 62% of patients in the study were married. The sample was primarily classified as I or II according to the NYHA system. The intervention consisted of a registered nurse provided structured telephone surveillance and treatment for HF and coordination of patients' care with the physician. The intervention included an initial educational session, nurse-initiated follow-up telephone contacts, pharmacologic management, and nurse-initiated communication with physicians. The telephone counseling session took place within one week of randomization and took place weekly for six weeks, biweekly for eight weeks, monthly

for three months, bimonthly for six months, and as needed. The investigators found no significant reduction in rehospitalizations for HF or any other cause using a registered nurse to provide HF case management.

Laramee, Levinsky, Sargent, Ross, & Callas (2003) performed a randomized controlled trial of 287 patients in which 141 patients received the intervention, and 146 patients received usual care to test the effect of HF case management on the 90-day readmission rate in a heterogeneous setting. The HF case manager that led the intervention had 18 years of critical care and cardiology nursing experience and a master's degree, although the author does not specify that the master's degree is in advanced practice nursing. The intervention included early discharge planning, patient and family education, and twelve weeks of telephone follow up. Patient and/or family members received telephone calls at 1 to 3 days after discharge and at weeks 1, 2, 3, 4, 6, 8, 10, and 12. Time spent with each patient and family per telephone call ranged from 5 to 45 minutes. The telephone calls surveyed HF symptoms, laboratory values, medications, self-care activities, adherence to treatment plan and cardiac risk factor modification, next PCP appointment time, and resources and opportunity for patients and families to ask questions. Patients were instructed to contact their physician anytime a change in symptoms occurred. If symptoms or signs of CHF were detected during a routine telephone call, appropriate triage occurred and additional telephone calls to the patient were prompted.   After a twelve week follow up, the investigators found no differences in the 90 day readmission rates or medication adherence, however adherence to self-care and diet improved.

Vavouranakis, et al. (2003) performed a pretest/posttest observational community-based study of 33 NYHA class III and IV patients. Comparisons of cardiac admissions and QOL were made between the year before the intervention and the year after the intervention. After a brief training program regarding problems and treatment options associated with this particular group of patients, each of the three nurses participating in the study was assigned an equal number of patients in cooperation with the supervising cardiologist. The level of education was not mentioned by the authors. Specific instructions were given for early detection of symptoms or signs of fluid retention or excessive diuresis. Patients were educated about their status, diet, sodium restriction and limited physical activity (walking on flat ground for 20–30 minutes two to three times a week) at the beginning of the study. Written orders were given regarding their medical treatment, promoting optimal doses of diuretics, ACE inhibitors, nitrates, digoxin, use of oxygen at home etc. Patients received visits every 30 days by a nurse who recorded their clinical status and medications, controlled body weight, heart rate, blood pressure and performed ECG recording reviewed by the supervising physician. Having identified problems, the nurses then contacted the supervising physician and discussed any treatment changes. Telephone contacts were made approximately every 10–15 days to verify functional status and proper use of medications, as well as provide social support to the patients. Patients were also instructed to call the nurse or the supervising physician to report symptoms or any other problem promptly. The investigators found that the mean readmission rate decreased, and QOL increased in the year following the initiation of the intervention.

Riegel, Carlson, Kopp, et al. (2002) performed a randomized controlled clinical trial to assess the effect of telephonic case-management by a registered nurse on the resource use in patients with chronic heart failure. Patients were identified at hospitalization and assigned to receive six months of intervention or usual care based on the group to which their physician was randomized. The intervention that was led by a registered nurse consisted of contacting the patient by telephone within five days of discharge and using the Pfizer developed software for guiding HF management. The RN educational preparation was not reported. The average calls for the intervention group was 17 calls and 16 hours of the nurse's time over the six month period. Hospitalization rates, readmission rates, hospital days, days to first rehospitalization, multiple readmissions, emergency department visits, inpatient costs, outpatient resource use, and patient satisfaction were measured at three and six months after the intervention was initiated. The average participant was elderly (aged 72 years), almost equally divided by gender (51% female), predominantly unmarried (56% widowed, single, or divorced), and functionally compromised (97% were NYHA class III or IV).

The investigators found that the HF hospitalization rate was 45.7% lower in the intervention group at three months and 47.8% lower at six months. Heart failure hospital days and multiple readmissions were significantly lower in the intervention group at six months. Impatient HF costs were 45.5% lower at six months. Patient satisfaction was higher in the intervention group. The authors concluded that a standardized telephonic case-management program in the early months after HF admission can reduce readmissions, costs, and other resource use.

Riegel, Carlson, Glaser, Kopp, and Romero (2002) tested the effectiveness of a standardized telephonic disease management intervention in decreasing acute care resource use and cost in Hispanic patients with heart failure. The researchers used a post-test only factorial design to analyze data obtained in the randomized controlled trial conducted at a large healthcare system in Southern California. Performing a fully crossed analysis the researchers examined interactions between group (Hispanic versus non-Hispanic) as well as between types of treatment (telephonic case management versus usual care). The sample was 51% female, 56% unmarried, 73% educated at the high school level or above, 69% earning less than $20,000 annually, 67% living with someone, and had a mean age of 72 years. Ninety seven percent of the sample ranked III or IV on the NYHA classification scale.

The primary outcome measured in this study was mean number of HF rehospitalizations over a 6-month period. The intervention was nurse case management provided by telephone, standardized through a computer software program. The education levels of the nurses leading the intervention were not disclosed. Detailed educational scripts and talking points were included in the software on a variety of topics such as signs and symptoms, when to seek medical attention, daily weights, medication compliance, low salt diet, exercise, smoking and alcohol avoidance, advance directives, and vaccinations. An average of 17 telephone calls of decreasing length, intensity, and frequency were provided by the nurse case manager over a six month period. The study revealed that acute care resource use was lowered as effectively in the Hispanic patients as in the non-Hispanic patients, despite significant between-group differences in education, income, and living situations. The researchers concluded that Hispanic

patients with HF are receptive of, and responsive to, a case management intervention provided in a culturally competent manner. There were fewer readmissions at six months for the Hispanic group than the non-Hispanic group. Heart failure readmissions were 75% lower in the Hispanic intervention group than in the Hispanic control group, and in the non-Hispanic sample, HF readmissions were 36.8% lower at six months in the intervention group than in the control group. No significant differences were found when a fully crossed language by group statistical analysis was performed which means the intervention was equally effective in the Hispanic and non-Hispanic groups (Riegel, Carlson, Glaser, et al., 2002.)

Kasper, et al. (2002) performed a prospective, randomized study of 200 patients with 102 in the intervention group and 98 in the usual care group. The intervention team consisted of a telephone nurse coordinator, the HF nurse, the HF cardiologists, and the patient's primary physician. The education level was not defined for the HF nurse of telephone coordinator roles. Telephone calls were made within 72 hours of discharge, then weekly for one month, biweekly for two months, and monthly thereafter. The telephone nurse coordinator followed a set script and pursued problems as indicated. The HF nurses were assigned to assist the intervention group and helped to implement the therapeutic plan designed by the HF cardiologists. Patients had at least monthly follow-up with these nurses. After a six month follow up, the investigators found no significant differences in deaths, HF-related readmissions, or costs, however, the QOL score and goal weight maintenance were higher in the intervention group.

Krumholz, et al. (2002) performed a prospective, randomized study to evaluate the effect of a telephone-based intervention for HF patients post-discharge. The study included 88 patients with 44 each in the intervention and usual care groups. A registered nurse with cardiac patient experience provided the intervention which included a baseline home visit within two weeks of discharge from the hospital and subsequent contact by phone weekly for four weeks, biweekly for 8 weeks, and monthly for a total intervention period of one year. The intervention focused on education and support, but did not modify regimes. After a twelve month follow up, the investigators found that readmissions, costs, and deaths were lower in the intervention group.

Blue, et al. (2001) evaluated all cause readmission, HF-related readmission, deaths, and days in the hospital for HF patients using a prospective, randomized controlled trial of 165 patients. Eighty-one of the participants received usual care, and 84 of the participants received the nursing intervention. The nurses providing the intervention are identified as specialists trained in the intervention procedure and use of the protocol to manage medications. The intervention included planned home visits of decreasing frequency, supplemented by telephone contact. The focus of the intervention was education, home monitoring, psychosocial support, and referral. After a twelve month follow up, the investigators found that there was a decrease in all cause readmission, HF-related readmission, deaths, and days in the hospital for heart failure.

In a prospective, randomized study of 58 HF patients, Pugh, Havens, Xie, Robinson, and Blaha (2001) evaluated the effect of a nursing intervention on functional status, costs, and quality of life. There were 27 patients in the intervention group and 37 patients in the usual care group. The education or level of expertise of the nurse providing

51

the intervention is not documented. The intervention included enhanced discharge planning, post-discharge instruction, and intensive post-hospital collaboration with providers using telephone contacts and follow-up visits by the nurse case manager to the HF patient. After a six month follow up, the investigators found no differences in functional status, costs, and QOL of the usual care patients and the intervention patients.

Jaarsma, et al. (2000) used an experimental, random assignment study to determine the effects of a supportive educational nursing intervention on self-care abilities, self-care behavior, and QOL of patients with advanced HF. The authors refer to the nurse that is leading the intervention as the study nurse, and there is no explicit mention of the nurses' qualifications and education level. The study sample included 179 patients with a mean age of 73 years, 58% men, and NYHA class III and IV that were admitted to a university hospital with symptoms of heart failure. Patients were randomly assigned to receive either routine care or a supportive educational intervention. All patients were followed for 9 months, and data were collected by patient interview at 1, 3, and 9 months after discharge. The intervention included intensive education by a nurse about the consequences of HF in daily life by use of a standard nursing care plan developed by the researchers for older patients with heart failure. Topics that were discussed with intervention group patients included recognition of warning symptoms of worsening HF, sodium restriction, fluid balance, and compliance. Most intervention patients received an average of 4 visits in the hospital, 1 telephone call, and 1 home visit. Patients in the routine care group did not receive structured education, and a nurse or physician provided these patients with insight and information about medication and lifestyle. Clinical data was collected from the patient chart, and self-care agency was

assessed using the Appraisal of Self-care Agency (ASA) scale. The Heart Failure Self-care Behavior Scale was used to measure self-care behavior in the sample, and QOL was measured using the Heart Failure Functional Status Inventory, the Psychosocial Adjustment to Illness Scale (PAIS), and Cantril's Ladder. After statistical analysis, no significant differences were found between the two groups in self-care abilities; however the supportive educational intervention did enhance self-care behaviors after discharge. No differences were found in the functional capabilities of the two groups. The researchers concluded that a supportive educational nursing intervention in the hospital and home is effective in improving self-care behavior of patients with advanced heart failure.

Summary

The review of research literature on the subject of posthospitalization interventions for HF patients implemented by nurses who are not APNs revealed positive outcomes overall for HF patients. Of the 13 studies reviewed, nine studies reported positive outcomes in variables such as self care, HF-readmissions, diet adherence, QOL, hospital days, costs, and death. Varying intervention protocols were used by the investigators, but common themes throughout the literature are the education offered to the patients and the mode of information delivery. The educational topics reviewed with patients in most of the studies were signs and symptoms of HF, reports of worsening symptoms, monitoring fluid balance, performing daily weights, and adherence to diet and medication regimen (Shearer, et al., 2007; Sisk, et al., 2006; Riegel, Carlson, Glaser, et al., 2002; Riegel, Carlson, Kopp, et al., 2002; & Jaarsma, et al., 2000). Jaarsma, et al., (2002) averaged one call over a nine month period, and Riegel, Carlson, Glaser, et al.,

(2002) and Riegel, Carlson, Kopp, et al., (2002) averaged 17 calls over a six month period. Sisk, et al., (2006) contacted patients every three months. The most recent study used more frequent telephone contact in its intervention. Shearer, et al., (2007) contacted patients every two weeks by telephone. Findings in the research literature were that posthospitalization nursing interventions that include some use of telephone contact with the HF patients reduce readmission rates (Sisk et al., 2006; GESICA investigators, 2005; Krumholz, et al., 2002;  Vavouranakis, et al., 2003; Riegel, Carlson, Glaser, et al., 2002; & Riegel Carlson, Kopp, et al., 2002), improved self-care behaviors (Shearer, et al., 2007; & Jaarsma, et al., 2000), decrease costs and resource use  (Riegel, Carlson, Glaser, et al., 2002; & Blue, et al., 2001), and improved functioning and QOL (Sisk, et al., 2005; GESICA investigators, 2005; Vavouranakis, et al., 2003; & Riegel, Carlson, Glaser, et al., 2002).

Three of the 13 HF intervention studies found no significant positive outcomes. Kasper, et al. (2002) found no differences in deaths, HF-related readmissions, or costs using a registered nurse-HF intervention in collaboration with a cardiologist. Laramee, et al. (2003) found no significance in readmission rates and medication adherence in their study that was led by a HF case manager. Laramee, et al. (2003) suggests that specific case management programs need to be paired with specific patient populations to be effective, adding that a heterogeneous population and more frequently non-networked follow-up care setting could be the explanation for no significant findings in their study. The study by DeBusk, et al. (2004) found no significant reduction in HF-related hospitalizations using a registered nurse in the role of telephone case management. DeBusk, et al. (2004) speculated that the lack of significant findings may be related to a

54

low-risk patient sample. The lack of positive outcomes in the studies that are led by non-advanced practice nurses call for further investigation into the education and preparation of the nurses leading these interventions.

The variability of educational backgrounds and credentials of the nurses in these interventions lead the investigator to question the impact of nursing education/training on patient outcomes. While registered nurses led the interventions described in the studies, there is no description of their education level, whether associate's or bachelor's level education. Furthermore, there is no detail in the special training given to the registered nurse. In most cases special training is alluded to in the study although training in unclear (DeBusk, et al., 2004; Jaarsma, et al., 2000; Kasper, et al., 2002; Pugh, Havens, Xie, Robinson, & Blaha, 2001; Reigel, Carlson, Glaser, Kopp, & Romero, 2002; Reigel, Carlson, Kopp, et al., 2002; Sisk, et al., 2006; Vavouranakis, et al., 2003). Perhaps, an APN is the essential ingredient missing in the studies that did not lead to the achievement of positive outcomes.

Also, there is uncertainty which intervention and frequency of follow-up with HF patients are most beneficial to the HF population. Various approaches to the HF intervention have been documented. Although the exact HF intervention to employ is indistinct, implications of the literature lead to the conclusion that post-hospitalization interventions with the inclusion of telephone calls produce positive outcomes with HF patients.

APN-led Telephone Interventions for Heart Failure Patients

APNs, through education, expertise, and advanced assessment skills, are in a unique position to lessen the progression of HF with early identification and interventions to improve clinical outcomes (Gura, 2001). The APN plays an integral role in the evaluation and treatment of patients with heart failure (Gura, 2001). There is evidence of the positive outcomes produced by APN-led telephone interventions for the management of heart failure. The following review explores the research of telephone-based interventions led by an APN for HF patients.

Kutzleb and Reiner (2006) performed a prospective quasi-experimental study to evaluate the impact of an APN-directed approach to patient education which focused on lifestyle modification, daily weight measurement, diet, and medication compliance to improve QOL and functional capacity in HF patients. The sample of 23 patients, whose ages ranged from 18 to 75 years, was divided into two groups, a nurse-directed care (NC) group and a routine care (RC) group. The nurse performing the intervention was a clinical nurse specialist. The sample was 65% female, 39% married, and 91% were NYHA class II. The race of the subjects was not revealed. The study length was one year and both groups had clinic visits every three months per protocol, took a QOL survey and a six-minute walk test to measure functional capacity, and received smoking cessation, medication, and diet counseling in the clinic. Only the NC group received weekly telephone follow-up from the nurse using a standard questionnaire addressing all intervention areas. The nurse-directed intervention for patient education included daily weight charting and an education booklet for patients that described HF, listed recommendations to maintain heart healthy lifestyle and signs/symptoms of changes in

56

condition status that warrants medical notification. Medication counseling consisted of development of an individualized medication grid sheet listing each medication, dosage strength, administration schedule, and mechanism of action to reinforce the importance of compliance. Diet and nutrition counseling incorporated a food exchange list, food preparation tips, and a four-step approach to managing a low-salt diet. Individualized counseling concentrated on exercise, smoking cessation, and elimination of alcohol intake. There was a statistically significant improvement in the NC group's QOL, but functional capacity was not significantly impacted by the study team intervention.

A mixed method, pretest posttest study by Riegel, et al. (2006) evaluated the effectiveness of a motivational counseling intervention to improve self-care behaviors in HF patients. The intervention was based on the naturalistic decision-making framework and designed to emphasize motivation, skill building, and support methods of influencing self-care behavioral intentions. The APN delivering the intervention was trained by experts in motivational approach and family counseling. Four strategies were used to enhance motivation of the sample. Participants received, on average, 3 home visits from the APN over the three month period. Most patients received a follow-up telephone call as the interaction was winding down. The intervention sessions in the home were audiotaped, transcribed verbatim, analyzed using software, and augmented with personal stories from the APN delivering the intervention. Self-care was measured using the Self-Care of HF Index, and knowledge about HF was measured with the Common Sense Model of Illness framework. Of the 15 subject sample, 60% were female, 53.3% were white, 46.7% were high school educated, and 66.7% were in NYHA class II. There was quantitative evidence of improvement in HF self-care in 80% of the sample, and

57

qualitative evidence of behavioral change in 86% of the participants. The researchers

concluded that an intervention that incorporates the core elements of motivational

interviewing may be effective in improving self-care, but further research is needed due

to the small sample size of this study.

A prospective, randomized design was used by Benatar, Bondmass, Ghitelman,

and Avitall (2003) to compare HF outcomes from 216 patients randomized to 1 of 2

home health care delivery methods for 3 months after discharge. Care was delivered by

the home nurse visit (HNV) or the nurse telemanagement (NTM) method. In the latter,

patients used trans-telephonic home monitoring devices to measure their weight, blood

pressure, heart rate, and oxygen saturation. These data were transmitted daily to a secure

Internet site. An APN worked collaboratively with a cardiologist and subsequently

treated patients via the telephone. Both delivery methods used the same HF-specific

clinical guidelines to direct care. Outcomes of study included HF readmissions and length

of stay, anxiety, depression, self-efficacy, and quality of life. After 3 months, patients in

the NTM group (n = 108; mean ± SD age, 62.9 ± 13.2 years; 83% African American;

64% female) had fewer HF readmissions with shorter lengths of stay compared with the

HNV group (n = 108; mean ± SD age, 63.2 ± 12.6 years; 89% African American; 62%

female). Hospitalization charges at three months were less in the NTM group compared

with the HNV group. At six and twelve months, cumulative readmission charges in the

NTM group were also less compared with the HNV group. Quality of life was

significantly improved for both groups when post-intervention and pre-intervention

scores groups were compared. The investigators concluded the adaptation of state-of-the-

art computerized technology to closely monitor patients with HF with APN care under

the guidance of a cardiologist significantly improves HF management while reducing the cost of care.

Gorski and Johnson (2003) implemented a HF disease management program with 51 patients who completed the full program and tracked rehospitalizations, self-care, satisfaction, and cost savings. The HF Disease Management program emphasizes patient self-management skills, including daily weights, medication management, diet, regular medical follow-up, and notifying the physician of changes in condition. The role of the HF Disease Management Nurse included patient identification; assessment of patients' physical and behavioral health systems, self-management, and QOL questions; stratification of illness severity according to NYHA functional classification; and intervention through education, regular telephone calls, and referral to the home healthcare program. If the patient was admitted to home care, the nurse suspended the HF Disease Management telephone calls to avoid calls from multiple nurses. The HF Disease Management Nurse continued to communicate with the home care nurse regarding the patient's status and progress, reviewed home care documentation, and collaborated with the home care nurse for any additional skilled services required. When home care was completed, the HF Disease Management Nurse took over management of the patient's care, resuming regular telephone contact. All patients had a decrease in hospitalizations, and the self-care management of the subjects increased from <20% prior to the program to <80% at program completion. The estimated cost savings from prevented rehospitalizations were $165, 000, and patient satisfaction surveys revealed overall excellence.

Dahl and Penque (2001) conducted a quantitative, quasi-experimental study to determine if an APN-directed HF program improved clinical management and educational and support needs of the patient, leading to positive patient outcomes. The target population consisted of 1,192 patients who were admitted to the hospital for HF and discharged with DRG 127 either before the existence of an APN-directed HF program (n=583) or after program initiation (n=609). A convenience sample was used and participants were selected from a large metropolitan area in the Midwest for HF from 1995 to 1997. The sample was divided into the preprogram group and program group. The average preprogram subject was 72 years of age and white. The average program subject was 75 years of age and white, as well.

The features of the program group included institution of routine HF physician and nursing orders and a clinical pathway. An automatic referral system was put in place when the routine HF orders were used employing the services of an APN, social worker, and dietician. The APN served as the care coordinator and coordinated services of the social worker and dietician depending on the patient's compliance, knowledge level, and needs. Education sessions taught by the APN were directed toward patients with HF and their family members. Topics discussed included the definition and causes of HF, drug use and compliance, daily weights with parameters, 2-gram sodium diet restriction, activity guidelines, and symptoms to report. Other topics that were routinely discussed, if time permitted or if the patient was identified as being at risk, included fluid restriction, alcohol and smoking avoidance, fat and cholesterol monitoring, and avoidance of nonsteroidal anti-inflammatory drugs. The APN made follow-up phone calls after

discharge to high-risk patients. The goals of the follow-up phone calls were to reinforce education and provide support and motivation. Another role of the APN was to investigate the clinical management of patients with HF and make suggestions according to the recommended guidelines. Lastly, the APN was responsible for facilitating multidisciplinary group meetings for reviewing data from HF registry established at this setting. After statistical analysis, a significant reduction in length of stay and hospitalization readmission rates for the program group was documented (Dahl and Penque, 2001).

Whellan, et al. (2001) enrolled 90 patients in a HF disease management program using a pretest/posttest design. The investigators used nurse practitioners or nurse specialists in the disease management program to improve HF patient outcomes. Protocols were developed for management of medications. In addition, the CHF team designed protocols for exacerbations, including shortness of breath, chest pain, and weight gain. The group developed a patient education manual that reviewed topics such as the purpose of each medication, the importance of adherence, potential adverse effects and appropriate actions to take should adverse effects occur, low-salt and low-cholesterol diet, weight monitoring, physical activity, and resources available to patients with CHF. The manual included a daily diary for weights and diet. An inpatient consult service and an outpatient CHF clinic were initiated. The basic schedule for patients with NYHA class IV disease included weekly clinic visits for the first month and weekly telephone calls for the first 3 months. The frequency of clinic visits and telephone calls was modified by the physician, as needed. The clinic schedule for NYHA class II and III patients was every 6 weeks with biweekly telephone calls. This schedule was updated based on changes in

medications and symptoms to provide a set number of follow-up contacts for patients.

During each clinic visit and telephone call, the nurse practitioner or nurse specialist reviewed with the patient any changes in weight using the weight diary from the education manual. There was no home-monitoring system used as part of the program. All weights and vital signs, if taken by the patient, were self-reported. The investigators found a decrease in hospitalizations and inpatient cost and an increase in outpatient costs and clinic cardiologist visits with this telephone enhanced HF intervention utilizing an advanced practice nurse.

Paul (2000) used a pretest/posttest design with a convenience sample of 15 clinic patients admitted to a university hospital to determine the effect of a nurse-managed intervention on hospital readmissions, hospital days, length of stay, hospital charges, and visits to the emergency department. A nurse-managed outpatient clinic the cardiologist and a pharmacist evaluated the patient on the first visit. Then for subsequent visits a nurse practitioner reinforced education, reassessed patients, adjusted medications, and provided follow up clinic and telephone contact. The investigators found that total hospital readmissions and hospital days were reduced after beginning treatment at the clinic, although there was no change in length of stay, hospital charges, or visits to the emergency department.

<center>Summary</center>

All of the findings in the studies found positive outcomes for the HF patient with an APN-led intervention. Kutzleb and Reiner (2006) reported a significant increase in the QOL of HF patients with weekly telephone calls from an advanced practice nurse, and Benatar, et al. (2003) and Whellan, et al. (2001) found a reduction of readmissions and

<center>62</center>

cost when an APN worked collaboratively with a cardiologist using a telephone-enhanced HF program. Benatar et al. (2003) also found improvements in QOL in their study. Riegel, et al., (2006) used a motivational counseling intervention that included an average of three home visits and one telephone call by an APN to yield an increase in self-care behaviors by 80% of the sample. Gorski and Johnson (2003) implemented an APN-led disease management program that included telephone follow-ups with the patients and "as needed" coordination with home care that resulted in fewer hospital readmissions and improved satisfaction and self-care behaviors of HF patients. Dahl and Penque (2001) and Paul (2000) also found a significant decrease in length of stay and hospital readmissions using an APN-led intervention that utilized the telephone for follow-up.

Comparing the registered nurse-led intervention with the APN-led interventions, the APN-led intervention had consistently positive outcomes. All seven of the APN-led intervention studies revealed positive outcomes, while the registered nurse-led interventions revealed no significant improvements in the patient outcomes in three of the 13 studies reviewed (Whellon, et al., 2002; Lamaree, et al., 2003; & DeBusk, et al., 2004). While positive outcomes for HF patients have been achieved with some non-advanced practice nursing-led telephone interventions, the APN-led telephone interventions for HF patients reviewed for this study have attained promising results without fail. The unique role of the APN is designed for the application of competencies such as education, consultation, collaboration, and clinical expertise which will ultimately benefit the HF patient. Although APNs may be more costly than RNs, it is important to recognize that APNs significantly impact the outcomes of HF patients

63

(Delgado-Passler, & McCaffrey, 2006). In view of the increasing number of older adults diagnosed and hospitalized with HF, the savings that can be accrued by the healthcare system as a result of the quality care given by an APN will outweigh the difference in cost of APN services versus non-advanced practice nursing services.

## Conclusion

According to the American College of Cardiology (ACC) and the American Heart Association (AHA) guidelines (2005), educational outreach is useful to facilitate the implementation of practice guidelines. Disease-management programs for high risk HF patients are recommended to facilitate the implementation of practice guidelines, attack different barriers to behavioral change, and reduce the risk of subsequent hospitalization for HF. It is well recognized that improving patients' knowledge of HF and providing support, encouragement, and positive reinforcement of self-care behaviors improves outcomes in patients with heart failure (Albert, Eastwood, & Edwards, 2004). Heart failure is a complex clinical syndrome that may result from many disorders and can be exacerbated and worsened by comorbid conditions, lifestyle choices, psychological state and may other factors, including the quality and quantity of care people receive once diagnosed (Albert, 2006).

The literature consistently recognizes race, NYHA classification, and comorbidities as predictors of HF-related readmission, while age is a predictor linked to both HF-related readmission and poor self-care behaviors. There are limited predicting factors of QOL that can be consistently found in the literature. There is evidence that telephone interventions can be useful in promoting positive outcomes for patients with chronic illnesses (Wong, et al., 2005; & Palmieri, et al., 2005). There are many discharge

programs for HF patients using telephone-based support that are coordinated by APNs, while others are directed by registered nurses. Some of the registered nurse-led HF interventions found little or no significance in improving patient outcomes, while all APN-led studies had positive outcomes (Whellan, et al., 2002; Laramee, et al., 2003; & DeBusk, et al., 2004). Reflecting upon the research studies reviewed, an APN-directed HF discharge program using telephone-based intervention can significantly improve HF management and QOL, as well as reducing costs and readmissions (Kutzleb and Reiner, 2006; Benatar, et al., 2003; Gorski and Johnson, 2003; Dahl and Penque, 2001).

Taken together the studies in this review of research literature suggest that characteristics can be identified in the HF population that place patients at high risk for frequent HF-related hospital readmissions, poor QOL, and suboptimal self-care behaviors, and telephone-enhanced interventions can improve outcomes for the HF patient, particularly when the nurse leading the intervention is an advanced practice nurse.

CHAPTER III

METHODOLOGY


INTRODUCTION

A pretest-posttest experimental design was utilized in this study. This design

enabled the researcher to examine a change by comparing baseline measurements with

the outcome measurements. The outcome variables, HF-related readmission rates, QOL,

and self-care behaviors, were tested to determine if intervention application resulted in a

causal relationship. Subjects were randomly assigned to the two groups, experimental and

control, so that antecedent variables were controlled (LoBiondo-Wood, & Haber, 2006).

The effects of an APN-led, telephone-enhanced intervention was the focus of this

investigation. Because random assignment and control inherent in this design minimize

the effects of many threats to internal validity, it was a strong design for testing cause-

and-effect relationships (LoBiondo-Wood & Haber, 2006). Research methods for this

study included: (1) application of the research design, (2) depiction of the setting,

population, and sample (3) details of the procedures utilized to perform the research, (4)

description of the instruments used to measure variables, and (5) planned statistical

analysis of collected data.

Research Design

The approach to this investigation was a pretest- post test experimental design in which subjects were randomly assigned into two groups, the experimental or intervention group and the control or usual care group. Pretest measures of demographic data, QOL, and self care behaviors were collected from both the intervention group and the usual care group at the time of enrollment in the study. Heart failure related admissions for the preceding 3 months were also assessed when individuals agreed to participate. For 12 weeks after the pre-test the APN contacted the subjects from the intervention group via telephone according to the intervention plan. The control group subjects received usual care. The three month follow up consisted of post-test measures for both subject groups to determine a change in the dependent variables.

Setting, Population, and Sample

The target population was patients in the Lee County area that have been diagnosed with heart failure. Lee County is located in east central Alabama along the Alabama-Georgia border, and is primarily a rural area. The 2000 Census showed Lee County's population as 115,092, with a 32% growth rate (Lee County Online, 2007). The racial makeup of the county is 74% white, 23% black or African American, and 3% Asian, Hispanic, Native American or other races.  The median income for a household in the county is $30,952.  The 2004 unemployment rate was commendably low at 3.8%, partly due to the fact that over 80% of adults age 25 and over have a high school diploma, and almost 30% have college degrees (Lee County Online, 2007). The medical community is represented in the area primarily by East Alabama Medical Center (EAMC).  EAMC is a public, non-profit 352-bed regional referral center in Opelika, and

is the second largest employer in Lee County with over 2,500 employees. It is served by almost 150 physicians. The accessible population was patients under the care of a cardiologist in a local cardiovascular clinic diagnosed with HF according to the New York Heart Association (NYHA) functional classification and the American College of Cardiology and the American Heart Association stages of HF, who met the eligibility criteria without delimitations.

Inclusion Criteria

The inclusion criteria for this study consisted of characteristics that were desired of the population utilized in this study. Inclusion criteria were:

1.  Patients that had been diagnosed with HF for a minimum of six months

2. Adult patients, older than 18 years of age

3. Patients under the care of a cardiologist in a cardiovascular clinic

4. Patients capable of self-care and honest self-reporting

Exclusion Criteria

The exclusion criteria for this study consisted of characteristics that were not desired of the population utilized in this study. The exclusion criteria for this study were:

1. Patients that did not have a telephone

2. Patients with a history of dementia, mental illness, or other conditions that would prevent self care.

Protection of Human Subjects

Human rights are the claims and demands that have been justified in the eyes of

an individual or by a group of individuals (LoBiondo-Wood, & Haber, 2006). Patients

have the right to self-determination, privacy and dignity, anonymity and confidentiality,

fair treatment, and protection from discomfort and harm. The human subjects in this

study were protected by providing a brief description of the objectives and methodology

of this project in lay terms, treating each patient with respect, and assuring

confidentiality. The telephone tool used by the APN contained an identification number

to the patient for purposes of the study, and master list with the identification number,

patient's name, and medical record number was accessible only by the investigator.

When statistical information was calculated, no identifiable information was revealed to

the statistical consultant. There were no known risks associated with telephone contact

with this group of human subjects. When problems beyond the APN's scope of practice

were encountered, the cardiologist was contacted for advisement of changes in the

patient's plan of care. The patient's were reminded to call the cardiologist for worsening

symptoms.

This study was approved by the Institutional Review Board (IRB) of East

Alabama Medical Center and Auburn University (See Appendix A). The cardiovascular

clinic and cardiologist also granted approval for this study. Written informed consent (see

Appendix B) was granted from the subjects after a thorough review of the study. Subjects

were given a copy of the informed consent. An alternative to written informed consent

for individuals interested in participating in the study that were unable to meet with the

investigator face-to-face was obtaining informed consent via telephone. If the patient

consented over the telephone, a registered nurse witness was asked to provide verification

of the patient's consent. A copy of the consent was sent to the patient per mail.

<div align="center">Procedure</div>

After IRB approval, the investigator retrieved a list of all patients with the DRG

of HF in a cardiology clinic. The APN used the telephone to contact all of those patients

diagnosed with HF that met the inclusion/exclusion criteria for the study. The contact

information was retrieved from the patient's medical record at the cardiology clinic. The

APN followed a script (See Appendix C) to determine the patient's interest in setting up a

face-to-face meeting with the APN at the cardiology clinic. An alternative option was if

the patient was interested in the study, but unable to attend a face-to-face meeting, the

consent and pre-testing took place over the telephone.

At the clinic meeting, the APN further explained the study, and if the patient

wished to continue, the informed consent was signed. The patients were randomly placed

in either the control group or the intervention group upon meeting inclusion criteria and

consenting to participate. Randomization was accomplished using sealed envelopes that

randomly contained either an experimental group or a control group designation. Upon

the patient's agreement to become a participating subject in the study and randomization

into assigned group, the APN administered tools for demographic data collection (See

Appendix D) and measurement of pretest variables, coordinated convenient telephone

appointment times with the subjects from the intervention group, and instructed the

control group that they would receive a telephone call in three months and be asked to

report HF-related admissions from the previous three months. The subjects were also

informed that they would be contacted in three months to schedule a time for post-testing at the end of the three month follow up period.

The three pretest variables measured were number of HF-related hospital readmissions for the prior three months, QOL, and self care behavior. The APN requested that the subject report the number of hospital admissions within the prior three months and the diagnosis of admission to measure the number of HF-related admissions. The patient's medical record was reviewed also in order to assure that accurate HF-related hospital admissions were reported. The subjects completed a Minnesota Living with Heart Failure Questionnaire (see Appendix E) for baseline data to measure quality of life, and the 29-item Revised Heart Failure Self-Care Behavior Scale (see Appendix F) for baseline data to measure self-care behaviors. The APN asked the subject to read the instructions aloud and verbalize comprehension before beginning the survey. If the subject was unable read, the surveys were read to the subject by the APN, and the subject verbalized the response to the question. Upon completion of the initial data collection, all subjects were reminded to continue calling Opelika Cardiovascular and Associates with problems or concerns with their health.

The subjects that were in the control group received the usual care from the cardiologist clinic. Usual care for patients with HF under the cardiologist's supervision includes education by him or a BSN staff nurse about exercise recommendations, low sodium intake, medication regimen, and when to call the physician with increased swelling or shortness of breath. Depending on the type and class of HF, the recommendations are adjusted for each patient. Exercise recommendations are aerobic exercise according to patient tolerance. Blood pressure and fluid balance is generally

71

maintained with beta-blocking agents, angiotensin receptor blockers, angiotensin-converting enzyme inhibitors, calcium channel blockers, and diuretic treatment with thiazide or loop diuretics. The patient receiving usual care is counseled on low sodium food selections, and when to call the physician such as increased swelling or shortness of breath.

The cardiologist primarily admits HF patients to EAMC. The usual care for HF inpatients consists of the medications listed above used intravenously or in conjunction with intravenous positive inotropes such as Dobutamine or Milrinone. The usual education for the patient is done in the inpatient setting with a pamphlet produced by EAMC entitled, "Living Well…With Heart Failure" which defines HF; lists the symptoms; advises daily weighing, self-assessment, and medication adherence; identifies high sodium foods; and encourages smoking cessation. The patient has an option of continuing with cardiac rehabilitation education after discharge if interested which reviews the topics in the inpatient pamphlet. Upon discharge, the patient is scheduled for a follow up appointment with the cardiology clinic in two weeks. After the post-discharge clinic visit, the scheduled appointment times vary according to patient status.

The subjects in the intervention group received the usual standard of care plus an APN called on day 7, 14, 28, 42, 56, 70, and 84 after the face-to-face meeting. The HF telephone interview tool (see Appendix G) was used by the advanced practice nurse to document the subject's status. The APN recorded the subject's responses to the questions on the HF telephone follow-up tool which assesses HF symptoms, compliance to diet and medication regimen, self-care behaviors, and knowledge of when to contact the physician. The subjects were also asked to report hospital admissions during the

telephone appointment. Additional teaching consisted of (1) defining HF, (2) how to read food labels, (3) low sodium foods, (4) high sodium foods to avoid, (5) symptoms to report to the physician and associated urgency, (6) how to conduct daily weights, (7) how to update medication list and comply with medication regimen, and (8) the importance of smoking cessation in accordance with the American Heart Association guidelines.

All problems that were beyond the APN's expertise or scope of practice were referred to the cardiologist and documented in the subject's file with the corresponding date. There was only one advanced practice nurse gathering data and conducting telephone interviews with the subjects, to maintain control, reliability, and consistency of this study.

Heart failure related hospital readmissions that took place prior to the first telephone-intervention appointment with the subjects were included in the pretest measurement, and HF-related hospital readmissions that occurred after the first telephone-intervention appointment were included in the posttest measurement. Intervention group subjects that were admitted to the hospital during the first week of the intervention period were released from the study. If intervention group subjects were admitted to the hospital after the first week of the study, the telephone-intervention appointment was rescheduled provided that the rescheduled telephone appointment took place within seven days of the initial appointment date.

The intervention group post-test appointments were set during the telephone call of the last scheduled telephone appointment during the intervention period. For a three month follow-up, the post-tests were conducted at the cardiology clinic or via telephone if the patient requested to do so. The post-tests for the intervention groups were the

MLHFQ and the 29-item Revised Heart Failure Self-Care Behavior Scale, and the

subjects were asked to report HF-related readmissions during the previous three months.

After the 12 week intervention period and another 12 weeks for the post-testing period,

the control group subjects were called to collect data using the MLHFQ tool and the 29-

Item Revised Self-Care Behavior Scale. Also, HF-related hospital readmissions for the

previous 24 weeks were documented for the control group during post-testing.

## Instrumentation

Data collection in this study was accomplished by utilizing four measurements (1)

demographic data, (2) patient-reported, HF-related readmissions (3) The Minnesota

Living with Heart Failure Questionnaire, and (4) the 29-item Revised Heart Failure Self-

Care Behavior Scale. Demographic data was collected to identify common characteristics

among HF subjects with poor outcomes to raise awareness of patient's at high-risk for

readmissions, poor QOL, and suboptimal self-care behaviors. It was appropriate to

measure HF-related admissions, QOL, and self care behaviors in this study as these

variables can be linked to poor disease management.

## Demographic Data Collection

Orem (2001) recognizes basic conditioning factors (BCFs) as internal or external

factors of an individual that may influence the engagement of self-care. Basic

conditioning factors are essentially sources of individual diversity (Artinian, Magnan,

Sloan, & Lange, 2002).  Age, sex, socioeconomic status, culture, social support system

factors, and resource availability and access are BCFs that are relevant to this

investigation of HF patients. For the purposes of examining relationships between

demographic characteristics and HF patient outcomes, BCF or demographic data were

74

collected. The demographic data were collected during the initial contact with the subject answering a questionnaire (see Appendix A). The subject was asked the nine questions, and the APN documented the subject's response in each subject file. Identifying variables that are associated with readmission may help identify gaps in coordination of services within the hospital or between the hospital and community (Hamner & Ellison, 2005).

## Hospital Admissions

The hospital admissions were measured by self report and the medical record used by the cardiovascular clinic. The subjects are adults and capable of self-care; therefore, it was assumed that the subjects will be truthful lending reliability to the self-reporting method. Hospital readmissions were defined as each admission with a diagnosis directly related to heart failure. The admissions were measured three months retrospectively during the pretest, during the three month intervention timeframe, and during the three months following the intervention.

The research design was a pretest-posttest experiment; therefore HF-related readmission that occurred during the intervention was addressed. The HF-related readmissions pretest was measured from the day prior to the first telephone-intervention appointment to three months retrospectively, and the HF-related readmission posttest was measured from the day of the first telephone-intervention appointment to three months prospectively.

## Minnesota Living with Heart Failure Questionnaire

The Minnesota Living with Heart Failure Questionnaire (MLHFQ) was designed in 1984 to measure the effects of HF and treatments for HF on an individual's QOL, and considers the impact of HF in key physical, emotional, social, and mental dimensions of

quality of life (Rector, 2005). The MLHFQ tool contains two subscales that measure physical dimensions and emotional dimensions. Physical dimensions can be defined as shortness of breath, fatigue, peripheral edema, and difficulty sleeping. Emotional dimensions can be defined as concentration, memory, and loss of self control. The MLHFQ tool also measures psychological symptoms such as anxiety and depression, and social functions such as walking, household chores, working for a living, sexual activity, eating, and doing things with family and friends. In addition, questions about hospital admissions, cost of care, and side effects of medication were included in the questionnaire.

The investigator used the MLHFQ to ask each person to indicate, using a six point, 0-5, Likert-type scale, how much each of 21 facets prevented them from living as they desired (Rector, 2005). The MLHFQ inquires if certain symptoms of HF have prevented them from living life as they wanted, and the subject responds according to the corresponding number. On the Likert-type scale, zero stands for no, one represents very little, and five is associated with very much. The total score of the MLHFQ can range from 0 to 105. A lower score indicates that the individual has a perception of a better QOL, and a higher score indicates that the individual has a perception of a poor quality of life.

The results of the MLHFQ yield an interval level of data. This tool was used to measure quality of life due to its wide use and validity. Rector and Cohn (1992) confirm validity of the questionnaire by using factor analysis to evaluate correlation between the answer of each question with all other questions (George, 2003).

76

A factor analysis of responses found a highly inter-related subgroup of eight questions related to physical symptoms and another inter-related subgroup of five emotional domain questions related to the psychological distress (Rector, 2005). Totaling the Rector and Cohn (1992) document the reliability for the 21 item questionnaire as (r=0.93) and the reliability for the subscales: Physical impairment (r=0.89) and emotional impairment (r=0.88) (George, 2003). For the purpose of this study, the MLHFQ was used in the initial meetings for pre-testing and post-testing of the subjects. The sum of all questions was utilized to determine the subject's QOL within the physical, psychosocial, and socioeconomic areas of living. In addition, a physical dimension score and emotional dimension score have been identified by factor analysis and were scored by simple summation to further characterize the effect of heart failure on the subject's life. The questions totaled for the physical dimension score were 2, 3, 4, 5, 6, 7, 12, and 13. The questions totaled for the emotional dimension score were 17, 18, 19, 20, and 21 (Rector, 2005).

The 29-item Revised Heart Failure Self-Care Behavior Scale

Orem (2001) maintains that persons who engage in self-care have specialized capabilities referred to as self-care agency, a human power constituted of complex capabilities, including knowledge and skills. Before individuals with HF can determine the appropriate thing to do, they must gain knowledge of elements specific to their situation, reflect on their meaning for healthy functioning and development, identify the courses of action open to them, and determine the effectiveness and desirability of these courses of actions (Artinian, Magnan, Sloan, & Lange, 2002). A patient's QOL and HF-related readmissions heavily relies on putting HF self-care requisites into action. Orem

(2001) identifies six components of HF health-deviated self-care requisites: (1) seeking and securing appropriate medical assistance for their HF, (2) being aware of and attending to the effects of HF, (3) effectively carrying out medically prescribed diagnostic, therapeutic, and rehabilitative measures directed toward prevention of exacerbations or complications of HF, (4) being aware of and attending to or regulating the deleterious effects of medical care measures, (5) modifying the self-concept in accepting oneself as having HF, and (6) learning to live with the effects of HF and the effects of HF treatments.

Self care habits were measured using the 29-item Revised Heart Failure Self-Care Behavior Scale. This scale was developed as a modified version of The Heart Failure Self-Care Behavior Scale. The original Heart Failure Self-Care Behavior Scale was organized around three conceptual dimensions. Those conceptual dimensions were eight questions to measure compliance with medical regimen, seven items about "asking for help" behaviors, and four questions for activity adaptation. The questions in the original scale elicited yes or no responses, and the score was totaled by summing the number of yes responses. The higher score revealed better self-care behaviors.

Artinian, Magnan, Sloan, and Lange (2002) revised the original Heart Failure Self-Care Behavior Scale to (1) extend the item pool to cover 5 of the 6 components of Orem's health-deviation self-care requisites; (2) address the Agency for Health Care Policy and Research counseling and education clinical practice recommendations for immunization, alcohol restriction, smoking cessation, and physical activity in HF; (3) obtain information about the frequency of self-care actions by changing the response

format from "yes" or "no" to a Likert-type scale; and (4) improve the internal consistency reliability by increasing the number of items.

The 29-item Revised Heart Failure Self-Care Behavior Scale measures self-care behaviors according to the HF self-care requisites (Artenian, Magnan, Sloan, & Lange, 2002). Twenty-nine behaviors that patients with HF must perform, to some degree, to regulate (maintain or change) their own functioning are included in the 29-item Revised Self-Care Behavior Scale (Artinian, Magnan, Sloan, & Lange, 2002). Assuming an honest, accurate self-care assessment was provided, the subject graded his or her own self-care behaviors. The subjects were asked to indicate how often each behavior is used on a Likert-type scale of zero to five. Zero is associated with performing behaviors "none of the time", and five is associated with performing behaviors "all of the time." The estimated completion time for this instrument is ten minutes.

The instrument was scored by summing the items scored with the maximum possible score being 145, which indicates all self-care behaviors are performed all of the time. Content validity of this instrument was demonstrated through evaluations made by a panel of experts, including two nurse practitioners and two self-care experts, and the Cronbach's α reliability of the original use of the scale was 0.84 (Artinian, Magnan, Sloan, & Lange, 2002).

New York Heart Association Heart Failure Classification

The New York Heart Association (NYHA) HF classification was documented on the participants' demographic questionnaire. However, the participants were not asked to report this information. The cardiologist reported the NYHA HF classification for the demographic tool in order to identify the severity of the disease for each participant and

79

identify any possible relationships between NYHA HF classification and the variables of the study, SCBs, QOL, and HF-related hospital readmissions.

<center>Planned Statistical Analysis</center>

Data were analyzed using SPSS version 16.0 software with all test for statistical significance set at P<.05. Descriptive statistics were performed on all study variables.

To address the study's main question, the investigator hypothesized that there would be a decrease in HF-related hospital readmissions, and an increase in QOL and self-care behaviors in the intervention (or experimental) group compared to the usual care (or control) group. A mixed model ANOVA with a pre-test, post-test repeated measures factor on readmissions, QOL, or self-care behaviors and then an independent group's factor with the APN care versus standard care was conducted. Research question two was answered by computing the frequencies, means, and standard deviations of each of the demographic characteristics and comparing results between the experimental and control groups. Research question three and hypothesis four were analyzed with appropriate parametric statistics to determine if selected demographic variables such as gender, age, race, income, education, and marital status, along with NYHA HF classification are related to HF-related readmissions, QOL, and self-care behaviors. Pearson r correlations will be used to relate age and income to the dependent variables. Gender, race, education, marital status, and NYHA HF classification was analyzed was analyzed with t-tests and one-way ANOVAs.

<center>80</center>

CHAPTER IV

ANALYSIS OF DATA


INTRODUCTION

This chapter is divided into sections that describe the data analysis process,

reliability of testing instruments, statistical results, and application of findings to the

conceptual framework. The statistical tests utilized to describe the sample and respond to

each research question will be reviewed. The analysis of the data collected was focused

upon detecting significant improvement in the outcomes of this study which are HF-

related hospital readmissions, quality of life (QOL), and self-care behaviors (SCBs) of

the HF patient. Additionally, the data was reviewed to distinguish relationships between

specific demographic characteristics and the outcomes measured in this study.

Data Analysis

For convenience, all data collection was executed by telephone interview at the

request of the participants. The advanced practice nurse (APN) reviewed the instructions

of each tool and recorded the responses of each participant for pre-testing and post-

testing.  Questions in relation to demographic data, HF-related hospital readmissions, and

patient perceived QOL and SCBs were asked utilizing the demographic tool, Minnesota

Living with Heart Failure tool, and a 29-Item Revised Self-Care Behavior tool.

The time for telephone calls for pre-testing and post-testing ranged from 25 to 30 minutes, while the biweekly calls for the intervention period took from five minutes to thirty minutes per participant. The time needed for the telephone calls during the APN intervention period varied depending on the patient's HF severity which required further questioning or the patient's need to talk for supportive reasons. During the intervention period some participants went out of town, were hospitalized, or were unable to talk at the scheduled appointment time with the APN. Therefore, the telephone appointment was rescheduled within the week of the previous appointment. Other participants provided an alternate telephone number such as cell phone number ahead of time, so they could be contacted when they would not be at home.

When all data were collected, they were analyzed using SPSS 16.0 software with statistical significance set at $P<.05$. Research question one was answered by computing the frequencies, means, and standard deviations of each of the demographic characteristics and comparing results between the experimental and control groups. To address question two, a mixed model ANOVA with a pre-test, post-test repeated measures factor on readmissions, QOL, and self-care behaviors and an independent group's factor with the APN care versus standard care was conducted. Significance was determined comparing changes in the means of readmissions, QOL, and SCBs from pre-testing to post-testing within and between groups, changes in the means over the time period of the study, and interaction, meaning if there were differences between the groups over time. Finally, the answer to research question three was computed using Pearson r correlations to relate age and income to the dependent variables. Also, gender, race,

education, marital status, and NYHA HF classification were compared to dependent

variables with t-tests and one-way ANOVA tests.

<div align="center">Reliability of Instruments</div>

Cronbach's alphas were calculated with the current sample to determine reliability

of the testing instruments at both pretest and post test. Upon comparison with previous

estimates, these findings revealed consistent reliability as expected. The reliability of the

Minnesota Living with Heart Failure Questionnaire tool and the 29-Item Revised Self-

Care Behavior tool were evaluated at pre-test and post-test periods of the sample (Table

1).

Table 1

Comparison of Cronbach's Alpha of Current Study with Prior Reliability

| Instrument | # Items | Prior Alpha | Current Alpha |
|---|---|---|---|
| MLHFQ | | | |
| Pre-test | 21 | .93 | .928 |
| Post-test | 21 | .93 | .943 |
| 29-ISCB | | | |
| Pre-test | 29 | .84 | .764 |
| Post-test | 29 | .84 | .880 |

Description of Sampling Procedure

Utilizing the patient names obtained from the HF DRG list of a cardiology clinic, 100 patients' telephone numbers were retrieved. After calling each patient's telephone number, the APN made telephone contact with approximately 80 HF patients. Of these 80 patients, 62 patients agreed to give the APN their mailing address in order to receive the informed consent for review, along with an addressed envelope to send back a signed copy of the informed consent. However, only 17 patients returned the signed informed consent agreeing to participate in the study. Three patients wished to give phone consent which was signed by the APN and a registered nurse serving as a witness. The sample for this study consisted of 20 participants living with HF for more than six months, capable of self-care, and maintaining telephone access which met the inclusion criteria. There were nine males (45%) and 11 females (55%) in the sample (n = 20). After random placement in either the experimental group or the control group, the participants were asked to report demographic information. A description of the two groups is included in the response to research question one.

Results

Response to Research Question One

Research Question One: What are the demographic characteristics of the HF patients in this clinical setting? The 20 participants in this study reported specific demographic information to the APN upon the initiation of pre-testing. The participant was asked to share the following information: gender, age, race, annual income range, highest level of education, and marital status. The degree of heart failure was reported by

the cardiologist according to the New York Heart Association (NYHA) HF classification

scale.

Intervention Group

The intervention group primarily consisted of married, African-American females

whose level of HF severity was II on the NYHA classification scale. The mean age of the

intervention group was 60 years with a range of 49 to 69 years.  The majority of the

intervention group had not graduated from high school. It is also interesting to note that

all of the participants in the intervention reported an annual income of less than $20,000.

The demographics of the intervention group participants are presented in Table 2.

Table 2

Demographics of Intervention Group Participants

| Characteristics | Frequency | Percentage |
| --- | --- | --- |
| Gender | | |
| Male | 3 | 30% |
| Female | 7 | 70% |
| Race | | |
| African-American | 6 | 60% |
| Caucasian | 4 | 40% |
| Annual Income | | |
| < $20,000 | 10 | 100% |
| Education | | |
| Some high school or less | 4 | 40% |
| High school graduate | 3 | 30% |
| Some college | 1 | 10% |
| Post-graduate study | 2 | 20% |
| Marital Status | | |
| Single, never married | 2 | 20% |
| Married | 5 | 50% |
| Divorced | 2 | 20% |
| Separated | 1 | 10% |
| NYHA HF Class. | | |
| I | 2 | 20% |
| II | 5 | 50% |
| III | 2 | 20% |
| IV | 1 | 10% |

Control Group

Within the control group, the demographic primarily represented was married, African-American males whose level of HF severity was rated II on the NYHA classification scale. The mean age of the control group was 68 years with a range of 62 to 84 years. Participants equally reported some high school or less and being a high school graduate as their level of education. As in the intervention group, all participants of the control group reported an annual income of less than $20,000. The demographics for the control group participants are presented in Table 3.

Table 3

Demographics of Control Group Participants

| Characteristics | Frequency | Percentage |
| --- | --- | --- |
| Gender | | |
| Male | 6 | 60% |
| Female | 4 | 40% |
| Race | | |
| African-American | 6 | 60% |
| Caucasian | 4 | 40% |
| Annual Income | | |
| < $20,000 | 10 | 100% |
| Education | | |
| Some high school or less | 4 | 40% |
| High school graduate | 4 | 40% |
| Some college | 1 | 10% |
| Two year college graduate | 1 | 10% |
| Marital Status | | |
| Single, never married | 1 | 10% |
| Married | 6 | 60% |
| Divorced | 1 | 10% |
| Widowed | 2 | 20% |
| NYHA HF Class. | | |
| I | 3 | 30% |
| II | 5 | 50% |
| III | 2 | 20% |
| IV | 0 | 0% |

Research Question Two: Does the APN-led telephone disease management decrease HF-related hospital readmissions, and increase QOL and SCBs in HF patients? After pre-testing the experimental and the control groups, the experimental group received a three month APN-led telephone-based intervention. Both groups were post-tested after three months. A mixed model ANOVA with pre-test, post-test repeated measures factor on HF-related readmissions, QOL, and SCBs and an independent group's factor with APN care versus usual care was utilized.

Heart Failure-Related Hospital Readmissions

Hospital admissions related to HF were measured using patient report and review of the patients' medical records. The time period for the pre-testing of HF-related hospital readmissions was the three months prior to the initial contact with the participants. The time period for the post-testing of HF-related hospital readmissions was from the date of the pretest to three months after the intervention period.

The results of HF-related hospital readmissions revealed a significant interaction in HF-related hospital readmissions over time in the APN-led telephone-based intervention versus standard care ($F = 7.63$, $p = 0.013$). There was a decrease in the mean HF-related readmissions among the intervention group, while there was a slight increase in the mean HF-related hospital readmissions in the control group during the study. The intervention group's mean pre-test HF-related admissions were 1.00 (SD = 1.054) and mean post-test HF-related admissions decreased to .10 (SD = .316). The control group's mean pretest HF-related admissions were .50 (SD = .527), and mean post-test HF-related admissions slightly increased to .60 (SD = .699). As there was a significant difference

found between the two groups for HF-related hospital readmission over time, the

hypothesis that the APN-led telephone-based intervention will decrease HF-related

hospital readmissions was supported. The summary of repeated-measures ANOVA

influence of APN intervention on HF-related readmissions is presented in Table 4.

Table 4

Summary of repeated measures ANOVA Influence of

APN Intervention on HF-related Hospital Readmission

| Effect | DF | SS | MS | F | Sig. |
|---|---|---|---|---|---|
| Between subjects | | | | | |
| Intercept | 1 | 12.1 | 12.1 | 18.3 | .000 |
| Group | 1 | .000 | .000 | .000 | 1.00 |
| Error | 18 | 11.9 | .661 | --- | --- |
| Within subjects | | | | | |
| Time | 1.0 | 1.6 | 1.6 | 4.881 | .040* |
| Time * Group | 1.0 | 2.5 | 2.5 | 7.627 | .013* |
| Error | 18.0 | 5.9 | .328 | --- | --- |

Note: *p<.05

Quality of Life

The Minnesota Living with Heart Failure Questionnaire was used to determine

participants' overall QOL for this study. The questionnaire contained a total of 21

questions about how severely HF impacted their lives in a negative way. The MLHFQ

inquired if certain symptoms of HF have prevented them from living life as they wanted,

and the participants responded according to the corresponding number. On the Likert-

type scale, zero stood for no, one represented very little, and five was associated with

very much. The total score of the MLHFQ could range from 0 to 105. A lower score indicated that the individual had a perception of a better QOL, and a higher score indicated that the individual had a perception of a poor quality of life. The participants were pre-tested using the MLHFQ upon entry into the study, and post-testing for QOL occurred three months after the intervention period. The intervention group received the APN-led telephone-based intervention for three months after the pre-test, while there was no APN contact with the control group from the point of pre-testing to post-testing.

The results of the overall QOL score also revealed a significant interaction between group and time proving support for the hypothesis that the APN-led telephone-based intervention would improve quality of life. The mean pre-test score for total QOL for the intervention group was a mean of 52.1 (SD = 28.56) and their post-test score for total QOL was a mean of 33.4 (SD = 26.13) indicating an improvement in perceived QOL overall. The control group's pre-test score for total QOL was a mean of 51.1 (SD = 22.25), and the post-test score for total QOL was a mean of 57.7 (SD = 22.14) suggesting a decrease in perceived QOL overall. The intervention group reported more improvement in QOL overall, and the control group's QOL decreased. The significance found within subjects for time * group indicated that over time there was a significant interaction or an intercept point among the means of all participants of the study related to quality of life. See Table 5.

Table 5

Summary of repeated measures ANOVA Influence of

APN Intervention on Overall Quality of Life

| Effect | DF | SS | MS | F | Sig. |
|--------|----|----|----|----|------|
| Between subjects | | | | | |
| Intercept | 1 | 94381.225 | 94381.225 | 97.205 | .000 |
| Group | 1 | 1357.225 | 1357.225 | 1.398 | .252 |
| Error | 18 | 17477.050 | 970.947 | --- | --- |
| | | | | | |
| Within subjects | | | | | |
| Time | 1 | 366.025 | 366.025 | 1.349 | .261 |
| Time * Group | 1 | 1600.225 | 1600.225 | 5.899 | .026* |
| Error | 18 | 4883.250 | 271.292 | --- | --- |

Note: *$p<.05$

The two subscales for QOL measurement are physical and emotional. A physical

dimension score and emotional dimension score were calculated by simple summation to

further characterize the effect of heart failure on the participant's life. The questions

totaled for the physical dimension score were 2, 3, 4, 5, 6, 7, 12, and 13, and the

questions totaled for the emotional dimension score were 17, 18, 19, 20, and 21 (Rector,

2005).  The lower the physical and emotional dimension scores for QOL, the better the

QOL perceived by the participant, and vice-versa.

The results of the physical dimension score for QOL revealed no significant statistical differences between groups or over the time period of the study. However, there was a trend of improvement in the physical QOL in the intervention group with a mean pre-test score of 21.5 (SD = 12.9) and mean post-test score of 14.0 (SD = 9.76), while there was a slight decrease in physical QOL of the control group. The mean pre-test score for physical QOL by the control group was 23.4 (SD = 10.66) and the mean post-test score was 24.9 (SD = 10.49). The summary of repeated measures ANOVA influence of APN intervention on physical QOL is presented in Table 6.

Table 6

Summary of Repeated Measures ANOVA Influence of

APN  Intervention on Physical Quality of Life

| Effect | DF | SS | MS | F | Sig. |
|---|---|---|---|---|---|
| Between subjects | | | | | |
| Intercept | 1 | 175556.1 | 17556.1 | 101.178 | .000 |
| Group | 1 | 409.6 | 409.6 | 2.361 | .142 |
| Error | 18 | 3123.3 | 173.517 | --- | --- |
| Within subjects | | | | | |
| Time | 1 | 90.0 | 90.0 | 1.277 | .273 |
| Time * Group | 1 | 202.50 | 202.50 | 2.873 | .107 |
| Error | 18 | 1268.50 | 70.472 | --- | --- |

Note: *p<.05

The results for the emotional dimension of QOL revealed no significant

differences between groups and no significant interaction between groups. Yet, there was

a significant difference over time, meaning all participants in the study reported an

improvement in emotional QOL at post-testing. Again, a lowered QOL score indicated

improvement. The intervention group's mean pre-test score was 17.1 (SD = 5.78) and the

mean post-test score was 6.1 (SD = 7.24). The control group's mean pre-test score was

15.6 (SD = 6.67) and the mean post-test score was 10.5 (SD = 7.5).  The summary for

repeated measures ANOVA influence of APN intervention on emotional QOL is

presented in Table 7.

Table 7

Summary of Repeated Measures ANOVA Influence of

APN Intervention on Emotional Quality of Life

| Effect | DF | SS | MS | F | Sig. |
|---|---|---|---|---|---|
| Between subjects | | | | | |
| Intercept | 1 | 6076.223 | 6076.223 | 120.288 | .000 |
| Group | 1 | 21.025 | 21.025 | .416 | .527 |
| Error | 18 | 909.250 | 50.514 | --- | --- |
| Within subjects | | | | | |
| Time | 1 | 648.025 | 648.025 | 15.003 | .001* |
| Time * Group | 1 | 87.025 | 87.025 | 2.015 | .173 |
| Error | 18 | 777.450 | 43.192 | --- | --- |

Note: *p<.05

Self-Care Behaviors

The 29-Item Self-Care Behavior Scale was used to measure SCBs for pre-testing and post-testing. The participants were asked to indicate how often each behavior is used on a Likert-type scale of zero to five. Zero is associated with performing behaviors "none of the time," and five is associated with performing behaviors "all of the time." The instrument was scored by summing the items scored with the maximum possible score being 145, which indicates all self-care behaviors are performed all of the time. The higher the SCBs score the better the SCBs of the HF patient, and vice-versa. The participants were pre-tested using the 29-Item Self-Care Behavior Scale upon entry into the study, and post-testing for SCBs occurred three months after the intervention period. The intervention group received the APN-led telephone-based intervention for three months after the pre-test, while there was no APN contact with the control group from the point of pre-testing to post-testing.

The results for SCBs revealed a significant interaction (p < .001) indicating the intervention improved significantly more than the control group over the course of the study, supporting the hypothesis that an APN-led telephone-based intervention could improve SCBs of HF patients. There was an improvement in the mean SCB scores for the intervention group, however the control group's SCB mean score did not change. The intervention group's mean pre-test score was 95.9 (SD = 17.27) and the mean post-test score was 128 (SD = 9.47). The control group's mean SCB remained 94 at pre-testing and post-testing. The summary of repeated measures ANOVA for influence of APN intervention on SCBs is presented in Table 8.

Table 8

Summary of repeated measures ANOVA Influence of

APN Intervention on Self-Care Behaviors

| Effect | DF | SS | MS | F | Sig. |
|---|---|---|---|---|---|
| Between subjects | | | | | |
| Intercept | 1 | 426835.60 | 426835.60 | 1106.222 | .000 |
| Group | 1 | 3276.10 | 3276.10 | 8.491 | .009* |
| Error | 18 | 6945.30 | 385.850 | --- | --- |
| Within subjects | | | | | |
| Time | 1 | 2755.60 | 2755.60 | 22.664 | .001* |
| Time * Group | 1 | 2656.90 | 2656.90 | 21.853 | .001* |
| Error | 18 | 2188.50 | 121.583 | --- | --- |

Note: *p<.05

Anecdotal examples of how the APN interactions with HF patients via telephone

promoted SCBs are education opportunities regarding a low-sodium diet and weighing

daily to evaluate fluid retention. A patient that reported she was limiting her sodium

intake proudly stated that she had prepared turnip greens for dinner, and when the APN

asked the patient what she used to season the turnip greens she stated that she had used a

ham-hock. The patient was not aware of the large amount of sodium in the ham-hock she

used to season her turnip greens which was a common practice in her family. This was a

teaching moment that may not have arisen without the expertise of the APN to further

question the patient about her reported low sodium intake. Another example was that one

patient was not aware of the need to weigh herself daily, and she did not have additional

96

money in her already stretched budget to purchase a scale. The APN spoke with the cardiologist who had a contact number for a program that provides scales free of charge for HF patients in need. This patient verbalized her appreciation for the scale and reported daily weights to the APN when she obtained her scale. Also, a male patient who struggled with remembering to weigh himself daily finally began weighing himself daily after repeated encouragement from the APN and the suggestion to place a note on his bathroom mirror to remind himself when he awoke each day. The patient was then able to report his weight more consistently.

Response to Research Question Three

Research Question Three: Are there relationships between selected demographic variables, NYHA HF classification, and the independent variables in this study, HF-related readmissions, QOL, and self-care behaviors? The answer to this research question was calculated using one-way ANOVAs and t-tests for gender, race, education, marital status, and NYHA HF classification, while Pearson r correlations were used to relate age and income to the independent variables of the study.

While no significant differences between age, race, income, marital status, or education and the independent variables of the study were detected, there was a significant difference between the NYHA HF class and quality of life. There was also a significant difference between gender and QOL at pre-testing. The significant differences and other trends of interest related to gender and NYHA HF classification will reviewed.

Gender

There was a significant difference between males and females in the overall QOL

pretest (p = .037). The mean pretest score for QOL of males was 39 (SD = 20.55), while

the mean pretest score for QOL among females was 61 (SD = 24.13). However, the post-

tests for QOL were more similar among males and females at 41 (SD = 22.46) and 49

(SD = 30.25), respectively. This finding suggests that the males perceived their QOL to

be better than females at the time of pre-testing. At the time of post-testing, although the

males' overall QOL score was better than the females' overall QOL score, the males'

overall QOL score worsened over the time of the study while the females' overall QOL

score improved. See Table 9 for the means, standard deviations, and standard error for

gender and quality of life.

Table 9

Means, Standard Deviations, and Standard Error for Gender and Quality of Life

|  | N | Mean | SD | Std. Error |
|---|---|---|---|---|
| QOL at Pre-test |  |  |  |  |
| Male | 9 | 39.0 | 20.554 | 6.851 |
| Female | 11 | 61.9091 | 24.138 | 7.278 |
| QOL at Post-test |  |  |  |  |
| Male | 9 | 41.11 | 22.463 | 7.487 |
| Female | 11 | 49.181 | 30.254 | 9.122 |

*New York Heart Association Heart Failure Classification*

The NYHA HF classification was reported to the APN by the cardiologist using a scale of I to IV with I being the lowest level of HF severity and IV being the highest level of HF severity. The statistical results revealed that there is a significant relationship (p = .016) between NYHA HF classification and quality of life. There was only one level IV NYHA HF classification participant, and that participant had the most improved mean scores for overall QOL due to life circumstances which was an outlier in the statistical data, therefore this participant's scores were excluded from this analysis.

A trend of interest was the difference in QOL between levels of NYHA HF classification. The control group participants reported a decrease in QOL as the level of HF increased. Another interesting factor was that among participants QOL was consistently poor for those ranked at level III on the NYHA HF classification, and the class III HF participants were the only group that did not report an improvement in quality of life upon post-testing. Level III NYHA HF classification participants' had a slight decrease in mean overall QOL with a pretest score of 74.7 (SD = 16.37) and post-test score of 75.5 (SD = 20.40). The means, standard deviations, and standard error for NYHA HF classification and QOL are presented in Table 10 for the experimental group and Table 11 for the control group. Comparing participants with level I and II NYHA HF severity, note the improvement in the mean QOL scores for the experimental group from pretest to post test and the worsening of mean QOL scores in the control group from pretest to post test in Table 10.

Table 10

Means, Standard Deviations, and Standard Error:

 NYHA HF Classification and Quality of Life

| NYHA HF Class. | N | Mean | SD | Std. Error |
|---|---|---|---|---|

**Experimental Group:**

QOL pre

| | I | 2 | 55.0 | 21.213 | 15.0 |
| | II | 5 | 34.4 | 24.068 | 10.7 |
| | III | 2 | 71.5 | 12.500 | 12.5 |
| | IV | 1 | 96.0 | ---- | ---- |

| QOL post | I | 2 | 32.5 | 33.234 | 23.5 |
| | II | 5 | 19.6 | 11.865 | 5.3 |
| | III | 2 | 73.5 | 14.849 | 10.5 |
| | IV | 1 | 24.0 | ---- | ---- |

**Control Group:**

QOL pre

| | I | 3 | 41.3 | 26.006 | 15.0 |
| | II | 5 | 46.2 | 14.149 | 6.3 |
| | III | 2 | 78.0 | 21.213 | 15.0 |
| | IV | 0 | ---- | ---- | ---- |

QOL post

| | I | 3 | 45.0 | 19.313 | 11.1 |
| | II | 5 | 57.4 | 18.6222 | 8.3 |
| | III | 2 | 77.5 | 31.819 | 22.5 |
| | IV | 0 | ---- | ---- | ---- |

Summary

Twenty participants in the study were randomly assigned to either an intervention group or a control group. The majority of the participants were 64 year old African-American females who were married, high school graduates and earning less than $20,000 annually. Analysis of pre-test, post-test data revealed that there was a significant interaction in HF-related hospital readmissions over time in the experimental group versus the control group. Also, there was a significant interaction between group and time resulting in an increase in QOL among participants in the experimental group, and a significant interaction in self-care behaviors over time by the HF patients that had biweekly telephone interactions with an advanced practice nurse. There was a significant difference for all participants over time in the area of emotional quality of life. Additionally, there was a notable trend that would have likely resulted with statistical significance given a larger sample size. There was an increase in the physical dimension scores for QOL in the experimental group versus the control group.

Demographic factors that significantly correlated with elements of QOL were gender and severity of HF defined by the NYHA HF classification scale. There was a significant difference between the QOL of males and females. The male participants' had an overall higher perception of their QOL, although there was a decrease in QOL from pre-test to post-test. The female participants' had a lower overall perception of their QOL; however there was an improvement in their QOL from pre-test to post-test. Finally, there was a significant relationship between HF classification and quality of life.

CHAPTER V

SUMMARY, DISCUSSION, AND IMPLICATIONS


INTRODUCTION

The imminent effects of heart failure (HF) are increasingly evident by the vast amount of HF-related hospital readmissions and poor quality of life (QOL) reported by many patients living with this debilitating disease. To ward off impending mortality, HF patients are forced to adapt self-care behaviors (SCBs) that are often unknown to this population. Orem (2001) recognized that in abnormal states of health, such as HF, self-care requisites arise for patients that can be addressed by a supportive-educative system of nursing care. The advanced practice nurse (APN) empowers the HF patients with education and emotional support. The purpose of this study was to determine the effects of an APN-led telephone-based intervention on HF-related readmissions, QOL, and SCBs of patients living with heart failure. Information obtained from this study can be applied to future research for developing innovative HF interventions to advance the care and diminish the disparity of healthcare among all HF patients.

Characteristics of Participants

The vulnerability factors of the participants in this study warrant examination. Older age, African-American race, and low socioeconomic status have been related to higher risk with poor outcomes associated with heart failure. Sisk, et al. (2006) recognized HF as the leading diagnosis and cause of hospitalization among patients 65 years of age or older, and a number of the participants in this study are at the age of 65 years or fast approaching, while many are older. Consistent with the primary race of the participants in the study, HF is known to have a 50% higher incidence in the African-American population than the general population (ACC/AHA, 2005).Nationally, the African-American population has higher mortality and hospitalization rates compared with other racial/ethnic groups which is a major concern for these individuals (Garg, Baskar, Blum, & Bhalodkar, 2006). Given that socioeconomic status is strongly correlated with race and ethnic background and is a predictor of access to healthcare and education, the income and education levels of the participants also draw attention to the vulnerability of this sample (Schmitz, 2007).

For comparison, this study's sample will be reviewed with the samples from other APN-led studies for HF patients. Kutzleb and Reiner's (2006) sample of 23 patients was 65% female, 39% married, and 91% NYHA class II. Reigel, et al. (2006) utilized a sample of 15 participants which were 60% female, 53.3% Caucasian, and 66.7%   NYHA class II. Dahl and Penque (2001) had participants in their study that were primarily 70 years of age or older and Caucasian. Many of the other APN-led studies had similar sample sizes to the 20 participant sample size of this study. Similarly, both this study and the other APN-led studies' samples were comprised primarily of females and class II

NYHA HF classification. In contrast, this study's sample was primarily made up of African-Americans who were married, while the other APN-led studies' samples were primarily made up of Caucasians who were not married. It is interesting to note that African-American females were well represented in this study, as they are a high risk group for HF and commonly not represented in cardiovascular studies. According to the CDC (2004), women are more at risk for HF development with about 22 percent of men and 46 percent of women likely to develop HF within six years of having a heart attack. This vulnerable population warrants examination (Schmitz, 2007).

<div align="center">Heart Failure-Related Hospital Readmissions</div>

According to the CDC (2004), hospitalizations for HF have increased substantially rising from 402,000 in 1979 to 1,101,000 in 2004 in the United States. Heart failure-related readmission rates range from 15% to 30% at 90 days post-discharge, and data suggest about half of these readmissions could be prevented (Artinian, Magnan, Sloan, & Lange, 2002). Hardin and Hussey (2003) recognize inadequate patient education, poor symptom control, and insufficient social support as factors that contribute to preventable HF-related hospitalizations. For this study, HF-related hospital readmissions were measured by participants' report and the medical record.

This study revealed that there was a significant interaction for a reduction in HF-related hospital readmissions over time among participants who received the APN-led telephone-based intervention versus those who did not. There was a decrease in the mean HF-related readmissions among the intervention group, while there was a slight increase in the mean HF-related hospital readmissions in the control group during the study. Similarly, the findings in the research literature were that post-hospitalization nursing

interventions that include use of telephone contact with the HF patients reduce readmission rates (Sisk et al., 2006; GESICA investigators, 2005; Krumholz, et al., 2002; Vavouranakis, et al., 2003; Riegel, Carlson, Glaser, et al., 2002; & Riegel Carlson, Kopp, et al., 2002), just as the APN-led telephone-based interventions reduced HF-related hospital readmissions (Benatar, et al., 2003; Whellan, et al., 2001; Dahl and Penque, 2004; & Paul, 2000). The evidence greatly supports the positive impact that a telephone-based nursing intervention has upon patients living with HF, particularly when an APN is leading the intervention.

<div align="center">Quality of Life</div>

Quality of life refers to a polymorphous collage that embraces a patient's level of productivity, the ability to function in daily life, the performance of social roles, intellectual capabilities, emotional status, and life satisfaction (Kutzleb, & Reiner, 2006). Quality of life was measured using the Minnesota Living with Heart Failure Questionnaire. The questionnaire contained a total of 21 questions about how severely HF impacted their lives in a negative way. The MLHFQ inquired if certain symptoms of HF have prevented the participants from living life as they wanted, and they responded according to the corresponding number. On the Likert-type scale, zero stood for no, one represented very little, and five was associated with very much. The total score of the MLHFQ could range from 0 to 105. A lower score indicated that the individual had a perception of a better QOL, and a higher score indicated that the individual had a perception of a poor quality of life.

A positive impact on QOL related to the APN-led telephone-based intervention was revealed in this study. The participants that received the APN-led telephone-based intervention improved in overall quality of life, while there was no documented improvement in the control group. In addition to the positive impact of the intervention, factors such as marital status, gender, and NYHA HF classification were considered to be predictors or influential dynamics that impact the HF patient's quality of life. Luttik, Jaarsma, Veeger, and Van Veldhuisen (2006) found that QOL was consistently lower in HF patients who were single or living alone compared to HF patients that were married or lived with someone, but the QOL of the participants' in this study revealed no correlation to whether they were living alone or with someone. Evangelista, Kagawa-Singer, and Dracup (2001) reported that women generally perceived their health as better than men perceived their health. On the contrary, this study found that men perceive their QOL to be better than women perceive their quality life. The women participants in the study had lower QOL scores compared with the men, but the women had an improvement in perceived QOL at post-testing while the men participants' QOL declined at post-testing. This finding suggests that the APN-led telephone-based intervention may have more influence upon improving the QOL of women than men.

Another statistically significant finding of this study was the relationship between QOL and NYHA HF classification. The participants with higher levels of HF severity commonly had lower perceptions of quality of life. This finding is reasonable, as higher severity levels of HF reduce the functionality of the HF patient which seems to have an evident effect on QOL of the patients living with this disease. While there is limited information on specific factors that influence or predict the QOL of the diverse HF

106

population, this study has provided health care providers with the knowledge that patients with higher NYHA HF classification require an intensive focus to improve quality of life.

Additionally, there was a trend of improvement in the physical dimension of QOL for the participants in the experimental group versus those in the control group, and there was an increase in the emotional dimension of QOL overtime for all participants in the study. Perhaps the enhanced self-care abilities and education about recognizing HF symptoms, restricting sodium, and medication adherence are related to the improvement in physical QOL for the experimental group. The improvement in emotional QOL for all participants is encouraging, although it should be noted that a holistic view of emotional and physical QOL is paramount. Therefore, interventions for HF patients should aim to improve both dimensions related to QOL. The experimental group in this study improved in overall QOL which supports the positive impact the APN-led telephone-based intervention has upon HF patients.

## Self-care Behaviors

Self-care behaviors are paramount in positively influencing the outcomes of HF patients. Hospital readmissions related to HF could often be prevented if the patient practiced self care behaviors in the areas of mediation and diet compliance; sought help from a health care provider in a timely manner; and performed daily assessments for edema, shortness of breath, and weight (CDC, 2004). Heart failure patients must be educated about the importance of these tasks that are required of them to maintain health. The APN intervention in this study was the key factor in providing the HF patient with guidance for appropriate self-care. The Revised 29-Item Self-Care Behavior HF Scale was used to measure SCBs at pre-testing and post-testing.

An impressive finding for this study was the significant interaction in the improvement of SCBs in the experimental group versus the control group. The participant's in the experimental group reported improvements in diet/medication compliance, recognizing/reporting HF symptoms, exercise, and daily weighing. The APN-led telephone-based intervention was designed with the purpose of improving SCBs which can also be linked to a better QOL and fewer hospital readmissions related to HF exacerbation. The unique role of the APN provided education and social support for patients on an individualized level in order to meet specific cultural, physical, cognitive, and emotional needs of each patient.

In the review of the literature, other studies stated that certain patient characteristics were less likely to engage in self-care. Rockwell and Riegel (2001) concluded that patients with higher education and who are symptomatic may be more likely to engage in self-care than those who are poorly educated or asymptomatic. Chriss, Shepposh, Carlson, and Reigel (2004) found that significant predictors of self-care were higher age and male gender. However the participants in this study primarily consisted of HF patients that were female and at or below the level of a high school education, and there was an increase in SCBs among these individuals. Therefore, even patients that have been noted to be less likely to practice self-care respond positively to the APN calling biweekly. This finding demonstrates the effectiveness of an APN-led telephone-based intervention.

Support for Conceptual Framework

The theoretical basis of this study was Orem's self-care deficit theory. The idea that self care is a requisite for maintaining functionality is the paradigm for the APN-led telephone-based intervention. Before individuals with HF can determine the appropriate thing to do, they must gain knowledge of elements specific to their situation, reflect on their meaning for healthy functioning and development, identify the courses of action open to them, and determine the effectiveness and desirability of these courses of actions (Artinian, Magnan, Sloan, & Lange, 2002). Certain self-care requisites exist as a result of HF, and self-care deficits may result from lack of HF knowledge, poor dietary selections, or nonexistent social support. The APN addresses those self-care deficits and empowers the patients to practice healthy self-care behaviors. The nurse's role consists of regulating the exercise and development of self-care agency among patients, and the patients' role consists of accomplishing self-care (Orem, 2001).

The focal point of the conceptual framework was the educative/supportive system with the APN in the lead role. That is, if HF patients are educated and given the tools for managing their disease, SCBs would improve. The HF patient faces challenges of adapting self-care behaviors to maintain health with the existence of a chronic disease. If the patient has a knowledge deficit related to HF self-care behaviors, the action of self-care cannot take place, in turn, leading to a self-care deficit. Lack of heart failure symptom knowledge, poor dietary selections, and nonexistent social support are a few examples of factors that contribute to poor HF patient outcomes related to suboptimal self-care behaviors.

The purpose of this study was to determine the effects of an APN-led telephone-based intervention on HF patients. The participants who were exposed to the APN-led telephone-based intervention demonstrated self-management by calculating their daily sodium intake, documenting daily weights, and verbalizing medication regimens to the APN biweekly for three months. This finding parallels the conceptual framework which presumes that HF patients require nursing expertise to perform SCBs or improve patient outcomes when living with chronic disease. This study supports the hypothesis that HF patients who interact with an APN via phone biweekly exhibit improved self-care behaviors.

## Discussion

The purpose of this pre-test, post-test experiment was to determine the effects an APN-led telephone-based intervention would have on HF-related hospital readmissions, QOL, and SCBs of HF patients. The majority of the sample in this study represented African-American, lower income, and older individuals who are vulnerable for inadequate self-care, poor QOL, frequent HF-related readmissions, as well as higher mortality rates and poor access to healthcare. This sample accurately portrayed the HF population commonly seen in the Lee County. Therefore, the implementation of this intervention among the HF aggregate of Lee County should reap beneficial outcomes. The positive influence the APN intervention had on the HF-related hospital readmissions and the SCBs of the HF patients participating in the study emphasizes the need to explore the implementation of an APN-led telephone-based intervention with a larger patient population. Better SCBs are associated with improved QOL and a higher feeling of well-being (Jaarsma, Halfens, Tan, Huijer Abu-Saad, Dracup, & Deideriks 2000); therefore

the finding of improved SCBs in this study may lead to other areas of improvement in the life of the HF patient.

Two primary findings of this study were that HF-related hospital readmissions and SCBs of HF patients significantly improved with biweekly telephone interactions with an advanced practice nurse. The ability to recognize HF symptoms and the performance of daily weights remained the same for most of the participants in the control group, while the majority of the intervention group participants improved. The intervention group in the study was educated by the APN about recommended SCBs in accordance with current guidelines (ACC/AHA, 2005). Therefore, with knowledge of what to do for self-care and encouragement from the APN, HF patients positively responded to the intervention by performing SCBs and reducing HF-related hospital readmissions. The improvement in SCBs was likely a direct influence upon the significant reduction of HF-related hospital readmissions among participants in the experimental group. Similar to this study, Reigel, Dickson, Hoke, McMahon, Reis, and Sayers (2006) investigated the effect of an APN-led telephone-based intervention among HF patients using a pretest, post-test experimental design and found an 80% improvement in SCBs among the 15 subject sample. Gorski and Johnson (2003) also found improvement in HF-related hospital readmissions and SCBs of HF patients using an APN-led telephone-based intervention. The self-care management of the subjects in their study increased from <20% prior to the program to >80% at program completion (Gorski, & Johnson, 2003). Additionally, Paul (2000) found a decrease in HF-related hospital readmissions in their pretest, post-test study of 15 participants. The strong evidence of improvement in HF-related readmissions and SCBs of HF patients lends

credence to APN-led telephone-based interventions and necessitates further exploration of the APN's role in aiding HF patients to achieve desired outcomes. As HF-related hospital readmissions decreased and SCBs increased with the APN-led telephone-based intervention provided in this study, perhaps improvements in other outcomes could be expected in time.

Another significant finding of this study was that NYHA HF classification affects the QOL of HF patients, and it appears that the higher the level of HF severity according to the NYHA HF classification scale, the lower the QOL score measured on the Minnesota Living with Heart Failure Questionnaire. In this study the participants receiving the APN-led telephone-based intervention that were at levels I and II of the NYHA HF classification scale showed improvement in quality of life, However, participants at level III showed no improvement in QOL from pre-testing to post-testing. There was one level IV HF classification participant in the study who was in the intervention group. That participant was a statistical outlier according to the extreme increase in QOL at post-testing. This major improvement in QOL may be explained by this participant having a great improvement in life circumstances. Other studies that evaluated SCBs in HF patients using an APN-led telephone-based intervention approach also found an improvement. In a similar study, Kutzleb and Reiner (2006) evaluated the impact of an APN-directed approach to patient education which focused on lifestyle modification, daily weight measurement, diet, and medication compliance to improve the QOL of HF patients. The majority of the sample (91%) was classified at a level II on the NYHA HF classification scale. There was a statistically significant improvement in the

intervention group's QOL which supports the notion that APN-led telephone-based interventions can affect the QOL of patients in the earlier stages of HF severity.

A consideration that this study may have taken would have been to adapt the frequency of the APN-led telephone-based intervention contact according to the level of HF classification. Whellan, Gaulden, Gattis, Granger, Russell, Blazing, et al. (2001) adapted the frequency of APN to patient contact based upon NYHA HF classification, increasing the intervention frequency as the level of severity according to the NYHA HF classification scale. This type of delivery of the APN-led telephone-based intervention resulted in positive patient outcomes such as decreased hospital readmissions, so perhaps adapting the intervention to require more APN contact with the level III and IV HF patients would prove to be more successful. Comparing the level I and II NYHA HF participants in this study, the experimental group reported an improvement in QOL, while the control group reported a worsening in quality of life. This finding indicates that an APN-led telephone-based intervention may be more effective for HF patients at the early stages of severity. Further research is needed to confirm this idea.

The stipulation that the intervention should be delivered by an APN is supported by the lack of findings in a similar study by Pugh, Havens, Xie, and Blaha (2001). There was no documentation by the investigators that an APN delivered the telephone intervention, and no differences were detected in functional status, costs, and QOL of the usual care patients and the intervention patients. APNs, through education, expertise, and advanced assessment skills, are in a unique position to lessen the progression of HF with early identification and interventions to improve patient outcomes (Gura, 2001).

Therefore, utilization of these skilled professionals is paramount to achieve an improved QOL for patients at all levels of HF severity.

Limitations

A major limitation of this study was the small sample size that threatened the external validity. The small sample size may have skewed the results obtained and lessened the ability to generalize the findings of the study. The small sample size may have been influenced by the method of obtaining the sample. A substantial number of patients agreed to receive the informed consent packet via mail, but did not return the signed form. Perhaps, obtaining the sample face-to-face or via telephone with a witness would have increased the number of participants. Also, expanding the recruitment beyond one cardiology clinic to all cardiology clinics in the Lee County area may have increased the sample size immensely.

However, a potential threat to internal validity of this study was testing due to the possibility that collecting data using a pre-test-posttest method could change the attitudes or sensitize the participants. Utilizing the same tools for pre-testing and post-testing may lead to participants scoring better during post-testing due to learning the tool. Also, some participants, knowing the purpose of the study, may have reported answers to adjust findings in a particular direction or unintentionally reported inaccurate information truthfully. Also, acknowledgment of the experimental groups' potential attachment to the APN providing the intervention is warranted. The possibility exists that participants may have responded differently than the control group from pretest to post test seeking social desirability. Another factor that may have skewed information was that only patients highly motivated to improve self-care agreed to participate in the study, making it easier

114

to achieve improved self-care. Finally, mortality, an internal threat to validity, could have been a limitation in this study, because the time for participating in the study extended over six months. Thankfully, no participants were lost in this study due to death.

<p style="text-align:center">Implications for Research</p>

It is important to critically examine the effects of APN-led telephone-based interventions for HF patients. One recommendation for further study includes utilizing more than one APN to facilitate the intervention in order to establish that effects of the study are not strictly related to a single advanced practice nurse. A recommendation for further research may be to adapt the frequency of the APN-led telephone-based intervention contact according to the level of NYHA HF severity. Replicating this study with a larger sample size is suggested to investigate potential improvement in QOL and HF-related readmissions, in addition to self-care behaviors. Also gaining insight of the effect the intervention used in this study has on a more diverse population would be helpful to determine responses of varied demographic characteristics. Furthermore, to gauge themes concerning the responses of the quantitative tools used in this study, perhaps a mixed method approach to include qualitative data would be advantageous in targeting useful information.

<p style="text-align:center">Implications for Practice</p>

This study's findings confirm the other studies (Delgado, & McCaffrey, 2006; Kutleb, & Reiner, 2006; & Dahl, & Penque, 2001) in establishing the APN's role as an effective care coordinator. The results of this study offer implications for healthcare systems and APNs caring for HF patients.

<p style="text-align:center">115</p>

Healthcare systems that do not employ APNs should consider the importance of acquiring this type of nursing professional that can offer improved disease management of an ever-growing patient population. It is recommended that a HF program that includes an educative-supportive intervention led by an APN be implemented. The focus of a HF program should be aimed at changing patients' SCBs and meeting the needs of this multifaceted patient. As registered nurses are faced with numerous HF patients with many needs in the middle of a growing nursing shortage, the APN can manage the patients' individual needs. While positive outcomes for HF patients have been achieved with some non-advanced practice nursing-led telephone interventions, the APN-led telephone interventions for HF patients reviewed for this study have attained promising results without fail (Dahl and Penque, 2001; Gorski and Johnson, 2003; Kutzleb and Reiner, 2006; Paul 2000).   The economic outcomes for healthcare systems are also likely to be positive. The APN provides a unique position for healthcare systems because they can improve the quality of care given to HF patients while decreasing the cost to the institution and the patient.

Advanced practice nurses that manage HF patients' care should assure that patients are not denied the most appropriate therapy to reduce the symptoms of this chronic disease by utilizing current guidelines for the management of heart failure. Also the APN must apply specialized skills such as consultation, education, collaboration, and clinical expertise when caring for the HF patient and working with the healthcare team. It is important that the APN individualize teaching strategies to meet the specific cultural and cognitive learning needs of the patient. Continual assessment of the patient's ability

116

to recognize symptoms and respond appropriately must be included in each interaction between the APN and HF patient.

The participants in this study with levels I and II severity of HF on the NYHA classification scale have shown improvement in QOL, but the evidence is not clear concerning level III and IV severity HF patients. Perhaps the APN could investigate the effects of an APN-led intervention specifically for patients with higher severity levels of heart failure.

## Conclusion

It is well recognized that improving patients' knowledge of HF and providing support, encouragement, and positive reinforcement of self-care behaviors improves outcomes in patients with heart failure (Albert, Eastwood, & Edwards, 2004). Heart failure is a complex clinical syndrome that may result from many disorders and can be exacerbated and worsened by lifestyle choices, psychological state and may other factors, including the quality and quantity of care people receive once diagnosed (Albert, 2006). Orem's self-care deficit theory of nursing provided the basis of this study. Orem (2001) recognized that in abnormal states of health, self-care requisites arise from both the disease state and the measures used in its diagnosis or treatment. The APN can enhance the health of the patient by advocating exercise and physical fitness, medication compliance, nutrition and weight control, stress management, and maintenance of social support systems, thus improving HF-related hospital readmissions, QOL, and self-care behaviors. The goal of self-care is to empower clients and families affected by heart failure (Goodwin, 1990).

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122

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APPENDIX A

## EXPEDITED REVIEW: THE HUMAN SUBJECTS PROTOCOL

Title of Project:

**The Effects of an APN-led Telephone-based Intervention on Hospital Admissions, Quality of Life, and Self-Care Behaviors of Heart Failure Patients.**

A.     General Information
      1.     Investigator:
            a.     Name of Principal Investigator:  **Amy Brandon, RN, BSN**
                 Signature of Principal Investigator:

                 Date:  **07/05/07**
                 Address:  **1010B North 1$^{st}$ Street, Opelika, AL 36801**
                 Phone:  **(334) 749-3595**
            Qualifications of Investigator: **Critical Care Registered Nurse**
                                             **Certification**

                                        **Eight years of critical care experience**
                                        **Graduate Student, Auburn University**
                                        **(Nursing)**

            b.     List the name and position of other investigators participating in this project if any:

                 OTHERS:  **Jenny Hamner, RN, DSN (Faculty Sponsor)**
                 **Other faculty on thesis committee:**
                 **Kathy Jo Ellison, RN, DSN**
                 **Ramona Lazenby, RN, EdD**

            c.     If medical supervision is necessary, give the name of the EAMC Medical Staff physician who will be responsible for supervision: **Dr. Michael Aikens**

      2.     Type of Proposal or Activity:          (**X**) New          ( ) Renewal

If this proposal is part of a grant, please indicate the following:
Name of Grant: **N/A**
Principal Investigator of Grant: **N/A**

3.    Sources of Funds
<u>Governmental</u>
Agency or Agencies
Foundation(s)
Corporation(s)
Organization(s):
Individual(s):
None (**X**)

B.    Number and Type of Subjects and Controls

1. Number of Subjects and Controls: **Estimated number of subjects <u>80</u> <u>individuals</u>, the total number of subjects will be equally divided into experimental and control groups**

2. Type of Subjects and Controls: **Subjects will be Opelika Cardiovascular & Associates patients with a diagnosis of heart failure capable of self-care and owning a telephone. The control group will receive usual care under Dr. Aikens' supervision, and the experimental group will receive usual care under Dr. Aikens' supervision plus a follow up telephone intervention from an Advanced Practice Nurse.**

3. Populations from which derived: **The population will be derived from patients with the diagnosis of heart failure under the care of Dr. Aikens at Opelika Cardiovascular, & Associates.**

4.    None of the following ___**X**___, or including:

Minors under 14 yrs of age          Prisoners
Abortuses                           ___  Mentally Retarded
Pregnant Women                               Mentally Disabled
If any of the Populations above are involved, attach a statement indicating the reasons for using these groups: **N/A**

5. Will any of the subjects be from outside East Alabama Medical Center?
Yes_**X**_No_____ If yes, where from? **This study will involve patients from Opelika Cardiovascular, & Associates. While it is possible that they have been or will be a patient of East Alabama Medical Center, all subjects may not be from East Alabama Medical Center.**

C.    Duration of Study

Probable duration of entire study: **Six months**

Total amount of time each subject will be involved **Experimental group—1 hour and 15 minutes or more, Control group—40 minutes.**

Duration of each phase in which subject will be involved **Pretest measurements (20 minutes per subject for questionnaire and APN will retrospectively measure heart failure hospital readmissions for prior three months), Three month intervention period ( 5 to 30 minute telephone call to each experimental group subject every two weeks), and three month follow up post-test (20 minutes per subject).**

D.    Abstract of the Research Plan

1.    Briefly describe the objectives and methodology of this project in lay language.

**The purpose of this study is to determine the effects of an advanced practice nurse calling the patient with heart failure to assess heart failure symptoms and self-care behaviors. The objectives are to positively affect the patient in three areas: (1) fewer heart failure-related hospital readmissions, (2) a better quality of life, and (3) optimal self-care behaviors. Along with the three outcomes listed above, patient demographics will be documented (such as gender, age, race, education, and New York Heart Association heart failure classification) to determine if there are relationships between demographic data and the three measured outcomes of this study.**

**The investigator will retrieve a list of all patients with the diagnosis of heart failure from Dr. Aikens' clinic. Subjects will be contacted by telephone or by face-to-face meeting in the Opelika Cardiovascular, & Associates clinic. The investigator, who is the advanced practice nurse (APN), will follow a script to determine the patient's interest in participating   in the study. Informed consent may be given during a face-to-face meeting with the investigator, or if the subject prefers, informed consent can be given over the telephone after the investigator has read the consent and another Registered Nurse witnesses the consent of the subject. A copy of the informed consent will be given to or mailed to the subject.**

**The patients will be randomly placed in either the control group or the intervention group upon meeting inclusion criteria and consenting to participate. Randomization will be accomplished using sealed envelopes that randomly contain either an experimental group or a control group designation. Upon the patient's agreement to become a participating subject in the study and randomization into assigned group, the APN will administer questionnaires for demographic data**

130

collection and measurement of pretest variables, coordinate convenient telephone appointment times with the subjects from the intervention group, and instruct the control group that they would receive a telephone call in three months and be asked to report heart failure-related admissions from the previous three months. The subjects will also be informed that they would be contacted in three months to schedule a time for post-testing at the end of the three month follow up period.

The three pretest variables to be measured are number of heart failure-related hospital readmissions for the prior three months, quality of life, and self care behavior. The APN will request the subject to report the number of hospital admissions within the prior three months and the diagnosis of admission to measure the number of HF-related admissions. The subjects will complete a Minnesota Living with Heart Failure Questionnaire for baseline data to measure quality of life, and the 29-item Revised Heart Failure Self-Care Behavior Scale for baseline data to measure self-care behaviors. The APN will ask the subject to read the instructions aloud and verbalize comprehension before beginning the survey. If the subject is unable read, the surveys will be read to the subject by the APN, and the subject will verbalize the response to the question. Upon completion of the initial data collection, all subjects will be reminded to continue calling Opelika Cardiovascular and Associates with problems or concerns with their health.

The subjects in the intervention group will receive the usual standard of care plus the APN will call on day 7, 14, 28, 42, 56, 70, and 84 of the intervention time period. The Heart Failure Telephone Interview tool will be used by the APN to document the subject's status. Teaching by the APN will consist of (1) defining heart failure, (2) how to read food labels, (3) low sodium foods, (4) high sodium foods to avoid, (5) symptoms to report to the physician and associated urgency, (6) how to conduct daily weights, (7) how to update medication list and comply with medication regimen, and (8) the importance of smoking cessation in accordance with the American Heart Association guidelines.

At the completion of the intervention period, a telephone or face-to-face appointment will be determined for three months follow up post-testing. The subjects will be asked to report heart failure-related hospital readmissions for the three months after the intervention and to perform the Minnesota Living with Heart Failure Questionnaire and the 29-item Revised Heart Failure Self-Care Behavior Scale questionnaire. Then, the data will statistically analyzed to determine significance of findings.

2.      Risks and Precautions:List any possible risks – Physical, Psychological, and Social.  Describe any special precautions to be taken to avoid these risks.

**There are no foreseeable risks or discomforts for subjects involved with this study, however there is concern that their personal information is protected and that all subjects continue to contact Dr. Aikens and his nurse for healthcare.**

**Confidentiality will be protected, and only the primary investigator will know personal information about the subjects that can be linked to their name. All subjects will be reminded during pretesting procedures that Dr. Aikens should be contacted, as usual, for any symptom changes or healthcare needs they may have.**

3.      Confidentiality: Describe the procedures to be used to maintain confidentiality.

**The medical record will be viewed by the investigator to note degree of heart failure according to the New York Heart Association heart failure classification. The subject's name will be placed on a master list with a special identification number that will only be seen by the investigator. That identification number will be used to mark all of the information the subject shares in the questionnaires. Once all information is gathered, the master list containing the subject's name will be destroyed to prevent any of information from being linked to the subject.**

APPENDIX B

**INFORMED CONSENT**
for a Research Study entitled

"Effects of an Advanced Practice Nurse-led, telephone intervention on heart failure-related hospital readmissions, quality of life, and self-care behaviors on patients' with heart failure"

**You are invited to participate in a research study to** determine if an advanced practice nurse calling the patient with heart failure will have improved outcomes in three areas: (1) fewer heart failure-related hospital readmissions, (2) a better quality of life, and (3) improved self-care behaviors. This study is being conducted by Amy Brandon, RN, BSN, a graduate student from the School of Nursing at Auburn University and Jennifer Hamner, RN, DSN, Associate Professor, Auburn University School of Nursing. Dr. Aikens has approved this study and will continue to manage your healthcare. You were selected as a possible participant because you have been diagnosed with heart failure under Dr. Aikens' care at the Opelika Cardiovascular, & Associates.

**What will be involved if you participate?** If you decide to participate in this research study, you will be asked to fill out three questionnaires at the beginning of the study. You will be questioned about your heart failure-related hospital readmissions, how heart failure interferes with activities that you like, and what things you do to maintain your health. You may participate in this study by meeting with Amy Brandon at Dr. Aikens' Opelika clinic, or by telephone. You will receive a randomly sealed envelope designated either experimental group or control group. This will determine if you will receive telephone calls from Amy Brandon every two weeks or if you will continue the usual care you receive now. If you are chosen to receive advanced practice nursing calls, she will make appointments convenient for you. During the telephone appointments, she will ask you questions about your health associated to heart failure.

The time commitment for the questionnaires will be 20 minutes. So, if you are in the group that will not receive telephone calls from Amy, your total time commitment for this study will be about 40 minutes. If you are in the group that receives calls from Amy, you will be contacted every two weeks for a total of seven telephone appointments. The telephone calls will take approximately 5 to 30 minutes, depending on your needs, so the total time commitment for this group is about 1 hour and 15 minutes or more.

**Are there any risks?** There are no foreseeable risks or discomforts in being involved with this study, however there is concern that your personal information is protected and that you continue to contact Dr. Aikens and his nurse for your healthcare needs.

**Your confidentiality will be protected.** Your medical record will be viewed by the researcher to note your degree of heart failure. Your name will be placed on a master list with a special identification number that will only be seen by Amy Brandon. That identification number will be used to mark all of the information you share in the questionnaires. Once all information is gathered, the master list containing your name will be destroyed to prevent any of information from being linked to you.

Page 1 of 2        Participant's initials_____

**Your health will be protected.** You will be reminded during the study to continue to seek healthcare from Dr. Aikens, as usual. The calls from an advanced practice nurse will simply be to further help in your care.

**Are there any benefits?** There are no known direct benefits to you for participation in this study. The results of this study may show that having contact with an advanced practice nurse may help you improve or maintain your health, but this cannot be guaranteed. Your participation in this study may help us determine ways to improve the lives of patients living with heart failure.

**Will you receive compensation for participating?** No, there is no compensation for participants. This study is a student project that is being conducted without funding.

**Are there any costs?** There will be no costs to you for participation.

**If you change your mind about participating,** you can withdraw at any time during the study. Your participation is completely voluntary. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or to stop participating in this study will not jeopardize your future relations with Auburn University, Opelika Cardiovascular, & Associates, or East Alabama Medical Center.

**If you have questions about this study,** please ask them now or contact Amy Brandon at (334) 749-3595 or email at amy@auburn.edu or Jennifer Hamner at (334) 844-6757 or email at hamnejb@auburn.edu. A copy of this document will be given to you to keep.

**If you have questions about your rights as a research participant,** you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334) 844-5966 or email at hsubjec@auburn.edu or IRBChair@auburn.edu.


HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.

_____
Participant's signature                              Date

_____
Participant's Printed Name

_____     _____
Investigator Obtaining Consent  Date                  RN Witness, if telephone consent is given

_____     _____
Printed Name                                                      Printed Name

APPENDIX C

Script for APN introductory contact with patient.


Hello, Mr/Ms. _____. My name is Amy Brandon, and I am a graduate student from the School of Nursing at Auburn University. I am conducting a student in hopes of helping patients with heart failure stay in better health and keep from being admitted to the hospital so much.


Dr. Aikens has given his permission for me to work with his patients, and he will continue to handle your care. I would basically be checking on you by calling at designated times, answering any questions you may have about your health, and asking you questions about how you take care of yourself. I could explain the study in more detail if you like. If you are interested, we can set up a time to meet at Dr. Aikens' Opelika clinic, perhaps at your next scheduled appointment. If you are unable to meet with me and want to participate in the study, I can go over the consent form and the questionnaire with you over the telephone.


Please know that Dr. Aikens and I have you in our best interests. Are you interested in participating in this study? Do you have any questions that I could answer for you? Okay, thank you so much for your time! Goodbye.

# APPENDIX D

**Demographic Questionnaire**

Directions: Please fill in the blank or circle the answer that best describes you in the following questions.

1.  What is your sex?

    Male                                      1
    Female                                    2

2.  What is your age?              _____

3.  What is your race?

    African-American                          1
    Caucasian                                 2
    Asian                                     3
    Hispanic                                  4
    American-Indian                           5

4.  What is your annual income?

    Employed full-time                        1
    Employed part-time                        2
    Retired                                   3
    Unemployed/Between Jobs                   4
    Homemaker                                 5
    Student                                   6

5.  What is the highest level of education you have completed?

    Some high school or less                  1
    High school graduate                      2
    Some college                              3
    2-year college graduate                   4
    4-year college graduate                   5
    Post graduate study                       6

6. What is your marital status?
    Single, never married                     1
    Now married                               2
    Living together, not married              3
    Divorced                                  4
    Separated                                 5
    Widowed                                   6

**Thank for your time! This is the end of the questionnaire.**
_____
**Do not fill out this portion. This information will be obtained from your patient file at Dr. Aikens' clinic.**
New York Heart Association Heart Failure Classification_____

Pretest reporting of heart failure-related hospital admissions_____

# APPENDIX E

**MINNESOTA LIVING WITH HEART FAILURE[®] QUESTIONNAIRE**
The following questions ask how much your heart failure (heart condition) affected your life during the past 3 months (12 weeks). After each question, check the 0, 1, 2, 3, 4 or 5 to show how much your life was affected. If a question does not apply to you, circle the 0 after that question.

| Did your heart failure prevent you from living as you wanted during for the last 4 months by… | No 0 | Very Little 1 | 2 | 3 | 4 | Very Much 5 |
|---|---|---|---|---|---|---|
| 1. causing swelling in your ankles or legs? | | | | | | |
| 2. making you sit or lie down to rest during the day? | | | | | | |
| 3. making walking about/ climbing stairs difficult? | | | | | | |
| 4. making working around the house/ yard difficult? | | | | | | |
| 5. making going places away from home difficult? | | | | | | |
| 6. making your sleeping well at night difficult? | | | | | | |
| 7. making your relating to or doing things with your friends or family difficult? | | | | | | |
| 8. making your working to earn a living difficult? | | | | | | |
| 9. making your recreational pastimes, sports or hobbies difficult? | | | | | | |
| 10. making your sexual activities difficult? | | | | | | |
| 11. making you eat less of the foods you like? | | | | | | |
| 12. making you short of breath? | | | | | | |
| 13. making you tired, fatigued, or low on energy? | | | | | | |
| 14. making you stay in a hospital? | | | | | | |
| 15. costing you money for medical care? | | | | | | |
| 16. giving you side effects from treatments? | | | | | | |
| 17. making you feel you are a burden to your family or friends? | | | | | | |
| 18. making you feel a loss of self-control in your life? | | | | | | |
| 19. making you worry? | | | | | | |
| 20. making it difficult to concentrate or remember things? | | | | | | |
| 21. making you feel depressed? | | | | | | |

137

# APPENDIX F

**29-item Revised Heart Failure Self-Care Behavior Scale.**

Please indicate how often you practice each of the following self-care behaviors by checking the box using a scale ranging from 0 "never" to 5 "always" for each statement.

| **Self-care Behavior**<br>How often do you practice the behavior? | Never<br>0 | 1 | 2 | 3 | 4 | Always<br>5 |
|---|---|---|---|---|---|---|
| 1. I take my pills everyday. | | | | | | |
| 2. I always refill prescriptions for my pills on time. | | | | | | |
| 3. I keep appointments with my doctor. | | | | | | |
| 4. I take my pills as the doctor prescribed — I take all the doses of my pills. | | | | | | |
| 5. I think a person can live a happy and good life, even after having HF. | | | | | | |
| 6. I have a system to help tell me when to take my pills. | | | | | | |
| 7. I believe that having HF is a condition to which I can adjust. | | | | | | |
| 8. When I am short of breath, I rest. | | | | | | |
| 9. I get a flu shot once a year. | | | | | | |
| 10. I stay away from people who have a cold or flu. | | | | | | |
| 11. I talk to my doctor/family to make plans for the future. | | | | | | |
| 12. I spread my activities out over the whole day so I do not get too tired. | | | | | | |
| 13. To help reduce fatigue or shortness of breath, I limit the activities that are hard for me. | | | | | | |
| 14. I put my feet up when I sit in a chair. | | | | | | |
| 15. I limit my alcohol intake to 1 glass of beer or wine or 1 shot a day. | | | | | | |
| 16. I am a nonsmoker. | | | | | | |
| 17. I plan rest times during my day. | | | | | | |

| Self-care Behavior<br>How often do you practice the behavior? | Never<br>0 | 1 | 2 | 3 | 4 | Always<br>5 |
|---|---|---|---|---|---|---|
| 18. When I feel anxious about my worsening symptoms of HF, I talk to my doctor about it. | | | | | | |
| 19. I contact my doctor when I feel more short of breath. | | | | | | |
| 20. When I am short of breath or tired, I ask for help with something I am unable to do. | | | | | | |
| 21. I contact my doctor when I see my feet, ankles, legs, or stomach swell. | | | | | | |
| 22. I watch how much water I pass (urinate) each day. | | | | | | |
| 23. I do not eat canned soups or TV dinners. | | | | | | |
| 24. I am physically active (e.g. walk or ride a bike) 3 to 4 days per week. | | | | | | |
| 25. I am careful not to drink "too many" fluids. | | | | | | |
| 26. I weigh myself every day of the week. | | | | | | |
| 27. I contact my doctor when I realize I am feeling tired all the time. | | | | | | |
| 28. I contact my doctor when I have nausea or do not feel like eating. | | | | | | |
| 29. I contact my doctor when I have gained 2 pounds or more in a day or 3 pounds or more since my last visit to the doctor. | | | | | | |

# APPENDIX G

**Heart Failure Telephone Follow up Tool**

| | |
|---|---|
| Review purpose of call with subject PRN:<br><br>*Assess symptoms<br>*Reinforce Learning<br>*Help with barriers to care for self at home<br>*Help with communication to MD if needed | Telephone #_____<br><br>Date:<br><br>Notes: |
| 1. How have you felt since our last call?<br><br>( ) Better    ( ) Same     ( ) Worse | 9. Other Symptoms: |
| 2. Today's Weight _____lbs.<br><br>*Adherence to daily weight, recording, & reporting | 10. Describe current degree of exercise:<br><br><br><br>*Review symptoms indicating need to stop and rest PRN (tiredness, CP, SOB, N/V, cold sweat) |
| 3. Shortness of Breath (SOB)<br><br>( ) None   ( ) With Activity (specify) _____<br>( ) At Rest    ( ) Frequency _____<br># of Pillows for sleeping _____<br>Wake from sleep with SOB? _____ | 11. Review dietary implications PRN<br>• Salt holds body fluid, Alcohol weakens/slows heart.<br>Low Na+ diet:<br> ( ) Adherent  ( ) Non-adherent<br>Alcohol Use:  ( ) None  ( ) <1 drink/day ( ) More |
| 4. Fatigue?<br><br>( ) None ( ) Yes ( ) With Activity (specify)_____<br>( ) At Rest   ( ) On-Going | 12. Review reasons to call the Dr. Aikens PRN<br><br>( ) Patient's Action Plan Reviewed |
| 5. Cough?<br><br>( ) None  ( ) Yes  ( ) New Onset<br>Frequency_____<br>( ) Dry  ( ) Productive   ( ) At Night | 13. Review medications use:<br><br>Are all prescriptions currently filled? ( ) Yes ( ) No<br>Any barriers to taking medications? ( ) Yes  ( ) No<br>Knows purpose of medicines? ( ) Yes ( ) No<br>Any other problems/side effects?  ( ) Yes  ( ) No |
| 6. Changes in leg, abdominal, or other swelling?<br><br>( ) None  ( )  Yes, Describe _____ | 14. MD notification?<br><br>( ) Yes  ( ) No<br><br>Next Appointment _____ |
| 7. Chest Discomfort?<br><br>( ) None  ( ) Mild to Moderate   ( ) Severe<br>Chest Discomfort occurred:<br><br>( ) At Rest  ( ) With Activity (specify)_____<br>Actions taken by patient? _____ | 15. Hospital admissions since last call?<br><br>( ) None  ( ) Yes, how many? _____ |
| 8. Dizziness/lightheadedness?<br><br>( ) None  ( ) Yes, Frequency _____<br>( ) With Activity  ( ) Sitting/Standing  ( ) At Rest<br>Action taken by patient? _____ | 16. Changes since last call? Reinforce information. |